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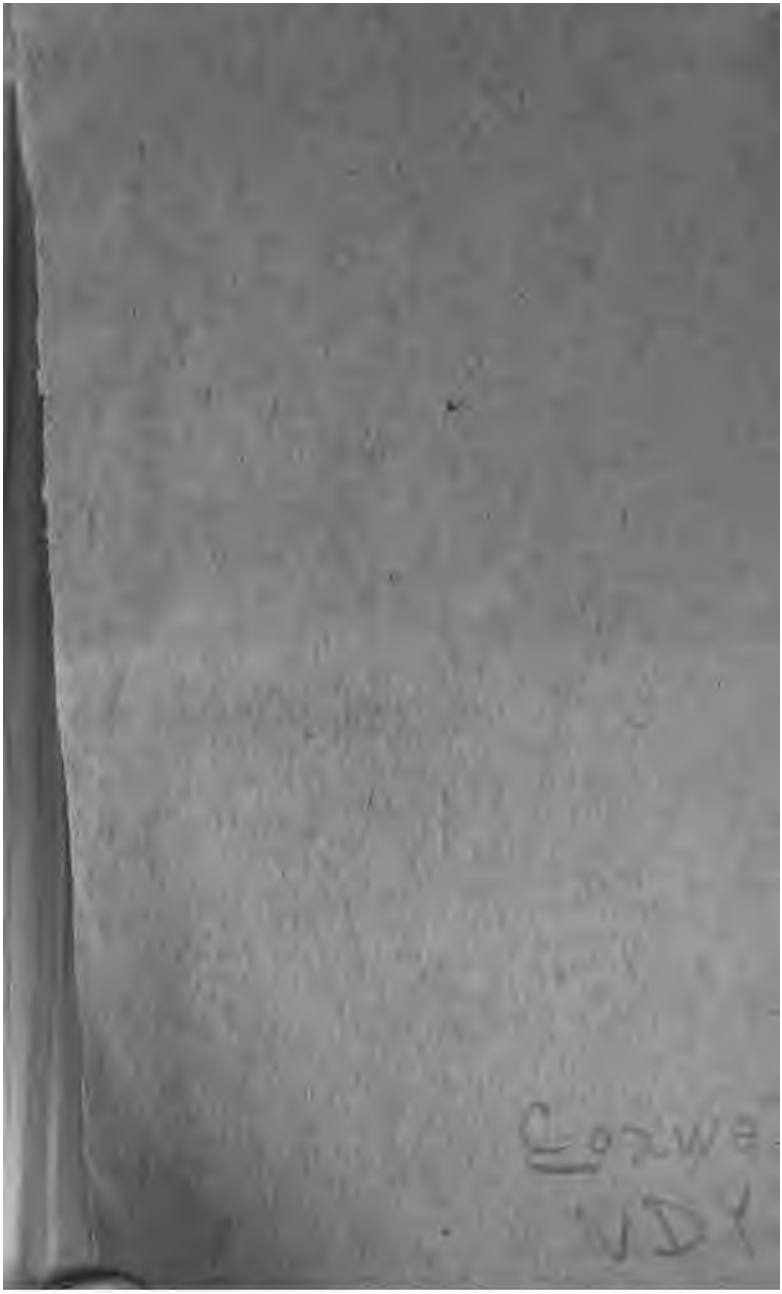
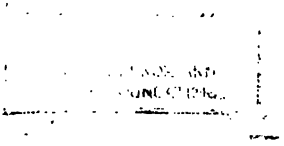
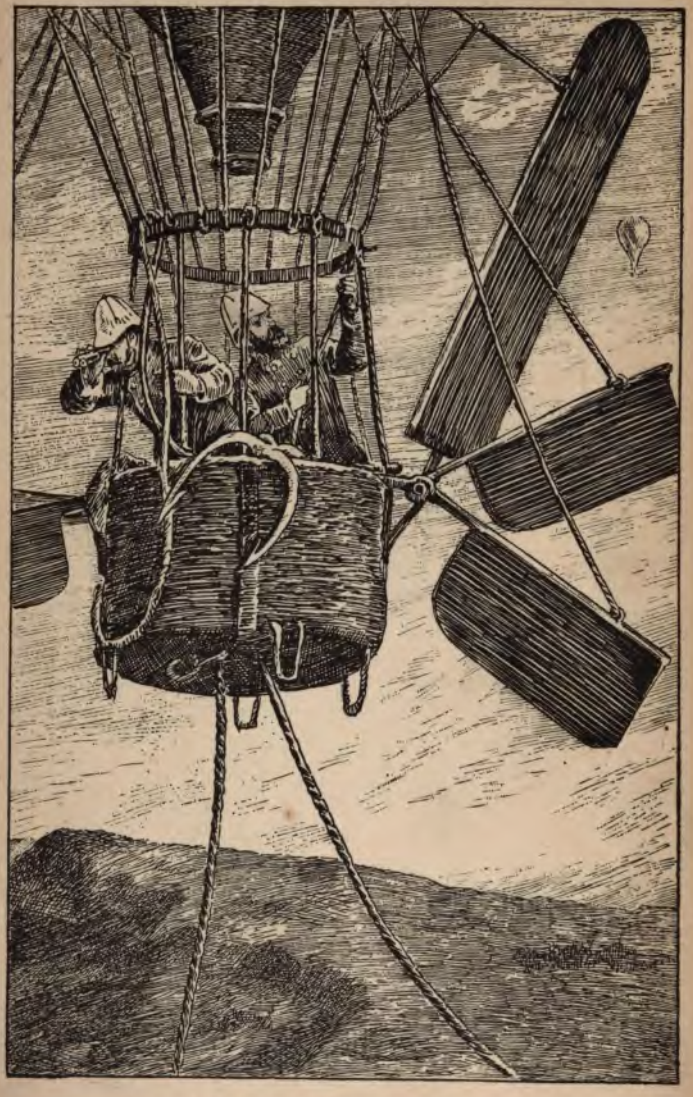


MY LIFE

AND

BALLOON EXPERIENCES.





MILITARY BALLOONING.—WORKING THE SIGNALS.

[Frontispiece.

MY LIFE

AND

BALLOON EXPERIENCES.

BY

HENRY COXWELL.

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INTRODUCTORY REMARKS

TO

PART II.

IN continuing my "LIFE AND EXPERIENCES," which broke off at the end of Volume I. for reasons therein explained, I do not purpose to dwell upon the entire series of incidents which have befallen me, but merely to allude to a few of those events in my career which may haply afford entertainment and instruction: some pages will be reserved for an account of the High Ascents which were made in behalf of the British Association, as I am anxious to do full justice to Mr. Glaisher in his persevering efforts and meteorological observations which commenced in the year 1862, and were carried on in various places for three successive years.

My own version of these travels in the upper air will not affect to imitate, but will follow and supplement those descriptions which have already been so ably given; and I shall

confine my remarks to a consideration of the practical and aëronautical results of our voyages: by this means I shall be enabled to formulate my own impressions which have not yet been published.

It may, and I trust will be, gathered from what I have written in my previous volume, that my chief motive for adopting "Ballooning" professionally, was not the mere idea of making money, but a desire to master the various and difficult problems of aërial navigation, so as to apply the knowledge thus obtained to Military and Meteorological uses. And I may perhaps be permitted to observe at the outset that, although I never ceased to give constant attention to the question of "propulsion," and have always been prepared to give due weight to the views of those who were better able than myself to form theories on the subject, yet, personally, I could never imagine a motive power of sufficient force to direct and guide a balloon, much less to enable a man or a machine to fly. I have seen so many failures and so many absurd plans devised, that I am at a loss to understand how ingenious men, possessed no doubt of ordinary mechanical instinct, could have reasonably looked for success in this direction.

Even when, so recently as 1884, the discoveries in

electricity had been utilized by Captain Renard and M. Kreb, and also by the Brothers Tissandier, I felt certain that the difficulties to be surmounted would not be overcome unless—which is, of course, out of the question—the air should invariably remain in a calm state.

Too much praise, however, cannot be awarded to these enterprising and scientific aëronauts for their noble efforts in the world of aërostatic science.

I do not, however, condemn as valueless the efforts made to solve a well-nigh insoluble problem, for certainly the principles of the flight of birds are better understood than they were, and this circumstance alone would stamp as valuable the results arising from the interchange of opinions which have been elicited at the Meetings of the Aëronautical Society of Great Britain, as well as at the Balloon and other Associations in different parts of the Continent and in America: and even without the discovery of a motive power at once lighter and stronger than at present exists, experts might, I believe, under existing circumstances, get more work out of balloons, especially in the direction of Military and Meteorological requirements.

MY LIFE

AND

BALLOON EXPERIENCES.

CHAPTER I.

MY FIRST WAR BALLOON, WITH SIGNALS ATTACHED.

IF the London and Provincial newspapers are referred to for the month of September, 1854, it will be seen that on the 7th of that month I ascended from the Surrey Zoological Gardens with the object of demonstrating to the public—and thereby perchance attracting the attention of the Government to—a new plan of signalling in the air.

In the announcements sent forth by Mr. Tyler, the spirited manager of this famous place of amusement, it was stated that "The object of the aëronaut was to rescue ballooning from the imputation that it presented no practical results, and to show that it was possible to convert it into a medium for conveying important intelligence." The spectator, it was further observed, "will suppose the balloon, when he sees it let up in a captive or free state, to be floating at a certain altitude, over a beleaguered fortress, the authorities in communication with it having the key of the signals, and seeking to

obtain, through these means, information as to the approach of an enemy.

"It is obvious, from the altitude of the balloon (be it more or less, according to the weather), that by the aid of glasses a vast distance around may be subjected to the minutest scrutiny, and a constant communication kept up with the authorities in the fortress. Of course, by a preconcerted arrangement, each signal will convey any sentence, word, or letter, previously agreed upon, and the number of signals may be increased *ad libitum*, by variety in their shape and colour.

"The fortress may be supposed to be Sebastopol, and the following communications, by way of illustration, will be made from the balloon :—

"No. 1.—Distant approach of the Fleet and Transports.
" ,, 2.—Landing of the Allied Forces.
" ,, 3.—Position taken up by the Troops.
" ,, 4.—Erection of Batteries.
" ,, 5.—The different positions attacked.
" ,, 6.—Final triumph of the Allies and surrender of the Fortress to the united arms of England, France, and Turkey."

A leading journal of the day, after describing this aëronautical venture, proceeds to explain that :—"The aëronaut, who set in operation once more his signals, was well understood in the working of these by those who were in possession of the key to them, and they resembled somewhat those which were formerly used on the roof of the Admiralty. When he had reached a considerable altitude, he liberated a number of pigeons, which he

considered as useful auxiliaries for warfare. The idea is ingenious, and we must admit that the signals were worked with much dexterity."

An extract of a more humorous character will suffice to show the kind of reception awarded to the first display of the sort that had ever been advanced in a branch of science which has since for many years occupied serious attention, and which has not only been improved upon by myself in the year 1882, but subsequently by Mr. E. Bruce and others; as also by Major Jones, R.E., whose suggestions, however, were more especially confined to small balloons.

WAR BALLOONS.

"Mr. Henry Coxwell, ready," thus wrote the *Morning Advertiser*, "like a true patriot, to serve his country when his country calls, and fly to her aid to Olympus high, when danger threatens, has turned his attention to the uses to which, in these piping times of war, ballooning may be applied. Indignant at the *airy* nothingness which the ascending experiment has hitherto revelled in, and resolved to entirely put aside all attempts to pander to the morbid appetite for objectionable performances, he has conceived the idea of 'taking stock' of a threatened fortress, by balloon survey, and has invented a set of signals, by which he can communicate either disastrous intelligence or 'something to their advantage.'

"The Gardens were crowded when the noble vessel, 'like a thing of life,' showed herself anxious to spring to her native element and leave this grovelling earth, and

> "—— All meaner things,
> To *low* ambition, and the pride of kings.

"Attached to the hoop, and hanging below the car, was a large signal apparatus.

"Mr. Coxwell was furnished with a bag of pigeons, and Admiral C. despatched one of them, when he had reached a high altitude, to the War Office, it was said, announcing that he had hoisted his flag and sailed from London.

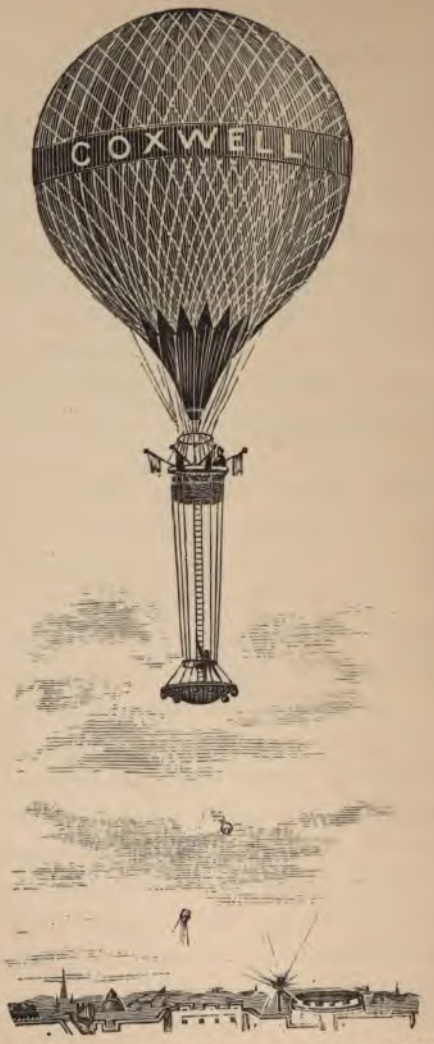
"Another pigeon was sent to the Admiralty, but, mistaking his way, the communication was opened, and the 'secret service' became known.

"Several other pigeons were seen to direct their course to the Foreign Office, and one knowing bird flew direct to the Stock Exchange."

But let us pass by the gibes and flaunts of the literary penman and turn awhile to an account, conceived in a more earnest spirit, of a

NIGHT BALLOON ASCENT AT LEEDS.

"On Monday, the scientific aëronaut, Mr. Coxwell, made a second night ascent from the Royal Gardens, Headingly, near Leeds, with his celebrated War Balloon, exhibiting, at a great elevation, the *nocturnal signals* which he has proposed for war purposes. The balloon which Mr. Coxwell has so frequently ascended with on the Continent, by express command, before the King of Prussia, King Leopold, the Emperor of Austria, and the King and Queen of Saxony, is of large proportions. The balloon was beautifully illuminated by means of coloured fires connected with the signals, which burst forth, illuminating the earth below and the air for miles around. Afterwards he let go a kind of bombshell, which descended, the shells bursting above the earth, and the sharp sounds of their explosion



THE USE OF AERIAL TORPEDOES, AS DEMONSTRATED IN BERLIN AND ELBERFELD IN 1848-49.

[*To face p.* 5.

reverberating among the hills and adjacent country. The descent took place at Kebroyd, near Ripponden, five miles from Halifax and twenty from Leeds."

The engraving illustrates the plan I adopted in Berlin and Elberfeld.

So far back then as the Crimean War period, my experiments, while they met with public approval as a "spectacle," were far from being seriously regarded or turned to account by those in authority, and it needed many years of perseverance on my part ere a real military trial took place at Aldershot. I had hammered away in *The Times* for little less than a decade, when I was requested to be present at a sham fight, and to ascend from Thorn Hill with Captain Beaumont, R.E., several staff officers having previously made captive ascents.

As I intend to bring my autobiography to a close in the present volume, space fails me to refer to more than two other journeys in this year, and, as variety is said to be charming, I desire to place before my readers something extremely opposite to Warfare and Bombshells.

AMUSING SCENES AND SURPRISES.

Aërial travels admit of anecdotes having a gay as well as sombre colouring. The very act of getting away from this our planet, is often attended with exciting surroundings, especially when a lofty tower, a church steeple, or a row of trees, happens to come in dangerous proximity. Then again, the behaviour of companions, no less than their motives for going up, affords ample scope for adventure, while as to the return to mother earth, something enlivening is almost sure to *crop* up, especially if one drags

through a corn field, and has to settle with an exacting land-owner, inclined to be hasty and not charitably disposed towards those who unawares and without invitation, drop in upon him from the heavens.

Volume I. concluded with an account of a night in the fields not far from Basingstoke, as I jumped out of the wicker basket, to the astonishment of a farm labourer, who rushed to his companions in utter bewilderment; and well he might, for men on their way to work at early dawn, do not as a rule tumble across a prostrate balloon and a still more prostrate "ballooner."

I have, on many occasions, had rather droll interviews with the country folks, and at the risk of putting aside reckonings, elevations, and figures, I will on this occasion confine myself to the more attractive part of two journeys, which were made in the year 1854; the first may be characterised as

THE FARMER AND THE AËRONAUTS.

I had ascended with the late Mr. B. O. Conquest, and Mr. John Allan from London; it was the birthday of the former gentleman, and he resolved to commemorate it aloft. As regards the ascent, they were of one mind, but there was a difference of opinion about the descent; Mr. Allan wished to get as far away from home as possible, but Mr. Conquest preferred not to pass the twenty mile radius, as his family and a host of visitors, would be at his palatial establishment in the City Road, looking for his return; his views prevailed, and the balloon alighted near Barnet.

My companions, both of them corpulent men, had prepared themselves for a bump. This precaution, how-

ever, was not necessary on this occasion, as there was not much wind blowing. "There will be no rough work to-day," I observed, "we shall be received with open arms by that group in the next field."

"They do not ask us down," observed Mr. Conquest, as the grapnel lodged in a hedge, where the people were standing.

"No," I replied, "they certainly do not, and I observe one man who appears to direct the movements of the rest, he holds aloof, and tells them not to touch the balloon."

I then addressed this gaunt ill-conditioned fellow, and asked him to take a glass of Mr. Conquest's champagne.

"No," said the farmer, "hang your wine, I want your money."

"What for?" I asked.

"What for!" he replied, "why, damages."

"Damages," I cried, "where are they to be found?"

"Do you think," said he, "that a lot of people can come into my field without doing mischief? I want to be paid."

Astonished at the demand, we all protested, and, fortunately, no gas as yet had been let off, nor was the car in their grasp. I whispered, therefore, to Mr. Conquest that he had better get out and work his way home as best he could. I also asked him when he left, to go and fetch the grapnel and place it outside the car, but before doing so, I let off a quantity of gas, and asked two or three men to hold on, and after Mr. Allan and I had possession of the iron, I again asked the farmer, who had a long stick in his hand, to prove damage and not imagine it.

"That can be done presently," he replied, "I want

three pounds, and I shall stick to you and your balloon until it is paid."

"Will you indeed," was the curt reply, when Mr. Conquest, who had been apprised of my intentions, cried out, "Hands off there, *I'll* settle this matter;" in a trice up shot the balloon, leaving the farmer considerably amazed, and, as we heard next day from Mr. Conquest, fearfully enraged at being licked and laughed at on his own grounds. After our flight to Tittenhanger, he pounced upon Mr. Conquest, who dryly said, "Nay, I am only a passenger, and merely require twelve men and true at a shilling apiece, to show me the way to the railway station."

"Here you are, Sir, to any number, and as to that greedy hound, if he lays hands on you, or interferes in any way, we'll duck him in his own horse pond—this way, Sir, for the up train, no one shall harm you."

At the second landing we had quite another reception, being invited to dinner and provided with beds, and, what is more, sent on our way next morning in a carriage to catch the train.

MY BALLOON DESCENDS IN ESSEX BY NIGHT,

creating no small amount of surprise and alarm, and no wonder either, considering the singular circumstances under which it left the earth.

I was asked to ascend once more from the Globe Gardens, Mile End Road, as Mr. Francis, the manager, was going to have a benefit, and his application to me came just at a time when I was commencing to re-varnish the required balloon, which had been so frequently used that it became leaky, and although I had a second machine, I was

prevented from using it as it had gone off to Sheffield by rail, so that I had to do what I could with the faulty one.

The weather, though fine, was too hot for a balloon just oiled, indeed, a moist atmosphere would have suited it better than a broiling sun.

It was to be a nocturnal ascent, with pyrotechnic signals, and a general display of fireworks beneath the car.

Had the atmospheric conditions been of a humid and cloudy character, the holding powers of the silk would have passed muster fairly well, but it was evident to those possessing experience in such matters, that there would be a considerable loss of gas; at any rate it became doubtful, to me personally, whether sufficient ascending power would be retained to carry me up with the heavy mass of fireworks which had been prepared.

As the wind was comparatively still, I was enabled to make such a test of the ascending power as to leave no doubt about there being a vast deficiency in this respect; so that I had, first of all, to turn over in my own mind what to do in order to ensure the balloon going up with at least part of the fireworks. Well, I hit upon a plan which I had never tried before, and unfolded it to those who were as much interested as I was in giving satisfaction to the spectators.

There was, as may be imagined, a strictly private conversation amongst ourselves, and I was compelled to intimate that there was some danger as to a failure, unless they approved of, and assisted in, a novel kind of strategy, which would give no offence, and might, perhaps be productive of no inconsiderable degree of satisfaction.

"Then how are we to co-operate?" asked the proprietor.

Being thus challenged to reveal the plot, I said :—"You will have to provide us with a sack filled with straw, also a mop, and a hat, and if you can throw in a false wig and whiskers, and a face without much colour on it, we shall then be in a position to meet any emergency, by having a dummy substitute as aëronaut."

"Be sure, Francis, there is no failure," cried Mr. Gardner, "and I would suggest," he added, "that the concert should commence earlier than expected, so as to draw the people away from the enclosure while you are hatching your eggs, for I perceive this is a dodge of yours, Francis, and if it succeeds we shall think no worse of you, but if there is a row, and no ascent, this will be your last benefit."

When it was pitch dark and the visitors had re-assembled round the balloon, there arose a cry for lighting up, but the Manager pointed out that a blaze of light might endanger the undertaking, and, my voice being heard in confirmation of this protest, the pseudo aëronaut essayed to get in the car, an operation which he eventually succeeded in accomplishing without his real nature being discovered by a lynx eyed public.

Then the tail end of the paper tubing was ignited, and the balloon rose in capital form, many cheering, while one cried out, "Good night, Coxwell, a safe landing and pleasant trip;" another person, said to be a foreigner, sung out "*bon voyage*." Thus, amid many good wishes and general satisfaction, the sole occupant of the car (the dummy), preserved his composure, though some did con-

sider that he nodded most affably his entire approval of the good wishes expressed.

When once the fireworks were ablaze, and the dummy balloonist became diminished in the distance, the veritable aëronaut might have been seen by those in the secret, to be retiring enveloped in a cloak, and his hat being jammed over a pair of huge false whiskers. The spectators did not notice the disguised individual, who, to avoid a too close scrutiny, lost no time in quietly stealing away while all eyes were turned aloft. Nor did he remain long within the precincts of the Globe Pleasure Grounds; the air was so heavy he could not breathe freely, until he reached his home at Tottenham, when *mirabile dictu* the atmosphere suddenly improved, and a change came over the spirit of the scene. Yet even now, after the lapse of years, I well remember how glad I felt at escaping recognition; an angry and incensed crowd is not too nice a companion.

Fortunately I had not omitted to fix cards to the car and net work, requesting to be informed where the descent took place; so on the following afternoon I went over to see if any tidings had arrived. I was ushered into the presence of the proprietor, who chanced to have with him a visitor; this latter, noticing my anxious looks and earnest enquiry, and hearing my name, said:—"There has been the deuce to pay down where I live, Mister, about your balloon."

I ventured to hope that "no lives were lost," thinking it just possible that the gas might have been fired when the balloon landed.

"Lives lost," said the farmer; "why there was none to lose. One fellow found by my man Joe, was thought to

have expired, and certainly all the life he ever had was out of him, but *you know*, and *I know*, that he never had any, Mister."

"You mean the figure, the effigy, I presume; do tell us all about it old friend; nothing very serious I can perceive by your looks, and by Mr. Gardner's as well."

"I was called up this morning," said the farmer, "soon after six o'clock, our foreman begging me to hasten down to the long mead, and to bring my gun, as there was some monster a-rolling about in the agony of death. 'He has got a large eye or mouth at the top of his crown,' continued Joe, 'and none of the men will face him; there is also a *hornary* sized man dead on the grass.'"

"After taking down my gun," pursued the farmer, "Joe led me to where my men were gathered; the monster was behind a high hedge at this time, but it was bobbing about pretty briskly, and no sooner had I led them on over another field, than I stopped full short, and they all thought that I was done with fright."

"I've a great mind," says I, "to stand off about ten rods, and let fly both barrels among ye. Don't ye know, Joe," I says, "what that is?"

"No," was the answer, "do you Master?"

"Well, that's a balloon, Joe, that is, and I am that ashamed of you all for your ignorance. But, there, come along, maybe there's someone hurt." And then I found your *deputy* or effigy, as you call him, but I see very little family likeness."

"After that I read your orders on the ticket, but instead of slitting your balloon up, I pulled the valve open and

set our fellows to pull down the netting, as I had seen done before in another part of the county, and to make a long story short, Mister, the balloon is all right in the basket, and it is at your service, and I rejoice at your good luck in not having lost it."

After congratulating the farmer for his skill and friendly attention, I, of course, insisted upon his accepting some remuneration.

"No," he said, "I've told my friend Gardner that I want nothing of that sort, but if, some day, you like to take me to the upper regions"——

"He is a stupid," cried a female, as she joined us in the room, "and how can you be such a fool, Thomas, to think of such a thing," said his better half, as she was introduced by Mr. Gardner.

Thomas, however, vowed that he certainly *would* have an aërial outing or "inning," some day, and I agreed to gratify his wish whenever he might come, but, with a significant look at the good lady, I made his wife's consent a necessary part of the contract.

DEATH OF A FRENCH AËRONAUT AT TOTTENHAM.

Although I have lived for thirty-seven years in the neighbourhood of Tottenham, yet I was never called upon but once to be a juryman at an inquest in this part of the county, and my attendance on the occasion in question was touching the death of Monsieur Le Tour, aged forty-nine, who died from injuries sustained in a parachute descent which was made in the year 1854 on the marshes, very near to the spot where the late M. L'Hoste and M. Mangot landed after their famous trip from Cherbourg in the year 1886.

Several ascents and many descents have from time to time taken place at Tottenham—four by myself and one by Mr. W. Barker and Mr. Sutton. The last I undertook was on a great day of rejoicing on the day of the marriage of His Royal Highness the Prince of Wales.

Many men of learning and science have, in my recollection, lived in this part of Middlesex. The celebrated Luke Howard, Meteorologist, for one, who gave to the clouds and their modifications those descriptive names which have been generally accepted; here, too, his benevolent and religious sons, John and Robert Howard, resided—these were eminent chemists and scientific men; a son of the former is the present Joseph Howard, M.P.

The families of the Fowlers and the Forsters, including the late Secretary for Ireland, are also well known there; and Alderman Sir Thomas Owden, when he was Lord Mayor, had his mansion in this parish. Among medical men of considerable ability is Dr. W. Hall, who still occupies the identical house in which Sir Astley Cooper formerly resided. Thus much for a digression.

Not being present at Cremorne Gardens when M. Le Tour's parachute was attached to the balloon, I had no opportunity of noticing its form or the preparations. I was at home in the garden, keeping a watch on the quick travelling clouds as they came from the Metropolis, but I rather felt that the balloon would ascend alone, as it was not a day at all suited for a parachute descent. On they both came, however, rather earlier than I expected, and I perceived that neither were in good trim; they were driven by the wind at a sharp pace, and with the aid of my

father's old spy-glass, the same I looked through, at nine years of age, at Green's balloon, I saw that something was amiss with the parachute. It seemed to hang awry, and to have no car like Garnerin's or Cocking's, but a cross kind of seat, with wings above, which appeared most perilous, and too unprotected for safety.

As some townsmen were looking up at the same moment, I said :—"That thing will never surely be cut away on a day like this."

It passed on about a mile to the south of our house, and feeling sure that no attempt would be made at landing or separating until a more open country, without numerous houses, had been reached, I did not follow, having been frequently disappointed as a youth in hunts of this sort; but no great length of time had elapsed before some one came in with the sad particulars that a hasty descent had been made, and that Mr. Adams, the balloonist, was all right, but the Frenchman, whose parachute had not been let go, was much injured by being dragged over the ground and through the trees, so that it was necessary to convey him to the Railway Tavern, Park Lane, where the poor fellow was for ten days bed-ridden. His injuries were internal and severe, but he retained his national vivacity in the midst of his trouble and pain, fancying to the last that he would go up again, and come down in his parachute under more favourable circumstances.

I made it my business to see him daily, and to reciprocate a little of that attention which I had myself received in foreign countries when ballooning. There was only one friend (M. Franchet) from the land he had not long left

who came to see M. Le Tour, and I feel almost ashamed to own that as regards Cremorne or indeed the metropolis itself, scarcely a soul came to see the French aëronaut until I stirred up a few, through shame, to at least appear to take an interest in the poor fellow; but he had a polite and sympathetic well-wisher in the person of M. Franchet, who often visited my house after he had seen his fellow countryman, and I am happy to say that he had the best of attention, but not from some of those who ought to have looked after him.

Further particulars will be best gathered from a report of the inquest, when I was one of the jury.

On July 11th, 1854, Mr. Baker, coroner for East Middlesex, and a highly-respectable jury, assembled at the Railway Tavern, adjoining the Park Railway Station, Tottenham, to inquire touching the death of Monsieur Le Tour, a French aëronaut, who died from injuries sustained on Tuesday week. The inquiry excited considerable interest, and a large number of scientific gentlemen, including Messrs. Coxwell, Green, and Hampton, of aëronautic fame, attended the investigation. Mr. Coxwell was one of the jury, and Mr. E. M. Adams, Secretary to Mr. Simpson, the lessee of Cremorne Gardens, from which the fatal ascent took place, attended to watch the proceedings in the unavoidable absence of Mr. Simpson.

The parachute, which had been left at the hotel for the inspection of the jury, did not appear to have sustained much damage. There were no particular marks of violence apparent on the unfortunate gentleman's body.

William Henry Adams stated that he was aëronaut at

THE PRINCIPLE OF GARNERIN'S AND LE TOURS' PARACHUTE.

[*To face p.* 17.

Cremorne Gardens. On the 27th June, at about 7 o'clock in the evening, deceased descended from the Gardens in his parachute accompanied by witness in the balloon. Deceased as he sat in the parachute, was enabled, by means of a spring attached to a rope, to let himself off. The car of the balloon was about eighty feet from where deceased sat. M. le Tour, as he was fastened in his seat, moved by means of his feet, two large wings, with which he professed to be able to guide the machine. When the intended dis-union was supposed to have taken place, witness asked Mr. Spearman, an amateur, who was with him in the car, if the parachute had opened, as it ought to have done immediately. Mr. Spearman replied, "No," upon which witness looked over to see the cause, when he noticed that the parachute, ropes and all, had become twisted up. As the letting go of the parachute would have been instantaneous death to the deceased, witness determined on making a final descent in order that deceased might be released from his dangerous position. He considered, upon reflection, that the dampness of the grass, upon which the parachute had lain two hours before the ascent, accounted for the twisting of the ropes, which were quite new. It had not been arranged whether witness or deceased should discharge the parachute, although upon going up on a former occasion witness did so, and the attempt was entirely successful. The descent continued until reaching the meadows at Tottenham, where deceased bumped several times against the ground, the grapnels of the balloon not catching; and as they approached some trees, witness endeavoured to escape coming into collision

with them by raising the balloon, but before it had risen sufficiently, it passed over the trees, dragging the parachute with great violence through the branches. Having alighted in the adjoining meadow, the grapnel caught in the stumps of some trees. The parachute at that time lay at some distance from the balloon. Deceased was then conveyed to the Railway Tavern.

By the Coroner: While deceased was being dragged along the ground, the balloon was 125 feet above him. Some boys endeavoured to catch hold of some of the ropes as they passed along, but they had quickly to loose their hold. Deceased was strapped to his seat, and witness considered he might, while dragging along the ground, have loosened the straps and got out. He (witness) was afraid to sever the parachute from the balloon, as deceased must have been then caught up by the grapnels. The wings of the machine, which were made of canvas, remained expanded all the time from the ascent to the descent. Deceased was a free agent in the whole transaction, having given all the directions respecting the ascent. Witness had observed to deceased, before ascending, that the new rope might be affected by the weather, but he replied that that was the French way of doing it. Since the parachute had arrived in this country, it had undergone many alterations under the superintendence of Mr. Simpson, who had it enlarged, etc. Witness considered he only acted in the matter as agent of Mr. Simpson. A small model, together with drawings of the parachute, were produced and explained by Mr. Coxwell, who observed that the same principle had been adopted as used by Mr. Green in his ascent with the

unfortunate gentleman Cocking, and that it had been left optional with the person in the parachute to let himself off.

Mr. Green in reply to a question from the Coroner, said that if the ropes, instead of being twisted, had been braided, the moisture would not have caused them to crinkle up as they did, had that precaution been adopted, the accident might not have happened.

The witness in conclusion said, the machine belonged to deceased, and nothing was done without his consent. The ropes were all new, since the machine came from Paris. Mr. Simpson he understood, suggested the alterations to make the machine larger. Nothing, with the exception of the new lines, appeared mechanically wrong in the machine On the first occasion the machine had been on a warm platform, but in the last ascent it remained on the damp grass some time. In both ascents the preparations were made by the deceased.

Mr. George Marshall, of Tottenham, stated that he saw the balloon descend as he was passing along a meadow. As the balloon came towards witness, the man in the car called out for the rope to be held. Deceased was then dragging along the ground, entangled in the cords. The balloon again ascended, passing over the trees and dragging the parachute after it, when the machine passed witness, deceased appeared to be calling out to those in the car to cut away the parachute. When the balloon was secured, witness went up and found deceased insensible in the parachute; he was tightly strapped to the machine, and the cords had to be cut before he was released. He was bleeding from the forehead; a little water having revived

him, he spoke in French of his arm being injured. The parachute was dragging along the ground for some distance, a mishap which seemed to cause the mischief, as upon his first descent the man was sensible, and called out to those in the car of the balloon.

Adams, in reply to a question by the foreman, said that he was afraid to sever the parachute from the balloon, as the grapnel irons would have beeen certain to have caught deceased up again.

Mr. Marshall, in continuation, said that while deceased was dragging along the ground, the grapnel of the balloon was swinging in the air.

M. Henri Franchet stated that he resided in France, and was a Cabinet Courier. He was acquainted with the deceased, who was in his forty-ninth year. Witness witnessed the ascent, which was a most favourable one. The arrangement made between deceased and Adams was, that the latter should let off the parachute; witness saw the deceased frequently after the accident, when he told him that he should not have been injured had Adams let him down before the grapnel touched the ground. Deceased suffered from paralysis of the neck, which prevented his looking upwards. The ascent was made with the two-fold object of scientific experience and pecuniary gain. Deceased had made numerous ascents in France, three of which were before the Emperor and Empress, and his machine was patented.

Mr. J. B. Hicks, surgeon, stated that he attended deceased about a quarter of an hour after the accident. He was suffering from a paralysis of the lower extremities

and the left arm; his spine was evidently injured; three ribs were also fractured. His case was hopeless, and he gradually sank and died.

Mr. E. M. Adams, secretary to the Gardens, in explanation, said that before ascending, deceased expressed himself perfectly satisfied with all the arrangements. Mr. Simpson asked him to allow a French gentleman, as on a former occasion, to accompany him in the car of the balloon, as he could not speak English, but he refused to assent.

After some further evidence had been given, the coroner very minutely summed up, commenting feelingly on the manner in which persons recklessly risked their lives for some paltry lucre, and he remarked that it was high time the legislature interposed in putting a stop to such dangerous speculations.

The jury, after a brief deliberation, returned a verdict of "accidental death."

PROFESSOR BALDWIN THE PARACHUTIST.

Not three miles from Tottenham, where Le Tour died, Professor Baldwin, the most expert and successful aspirant in this branch of aërostation, appeared in his best form at the Alexandra Palace on Bank Holiday, August 6th, 1888, and there created a great sensation by his so-called drop from the clouds, which, in reality, was a daring parachute descent from a low altitude, but as this fact increased the risk, while it gratified the spectators, a decided "hit" was made (as the caterers for the public say), especially as the balloon is generally made to dart up and descend about the same time, or soon after, the parachute, and this variation proves a novelty, as does the quick return and re-

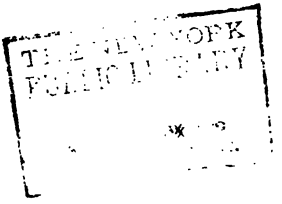
appearance of Baldwin on the platform. The sensational way in which the three acts of the performance are executed, and the original announcements of *A Jump from a Balloon*, have no doubt a great deal to do with the pecuniary success of the undertaking.

On the day of his benefit I had a chat, for the first time, with this dauntless American, and found him a modest and unassuming man, and there can be but one opinion as to his having extraordinary nerve. I did not observe in his parachute any indications of the umbrella form such as Mr. Hampton adopted in the year 1838-9, soon after Cocking's death. Mr. Hampton descended three times successfully; Le Tour made a similar number of descents; Garnerin, the first parachutist in England, in the year 1802 came down safely. Garnerin's daughter is said to have come down thirty-nine times in France and other places, Madame Poitvein also descended here.

Many persons who fail to read the latest books on ballooning, imagine that dropping in a parachute is quite a new exploit. I have always contended, like Green, that the balloon can be made the best kind of parachute. Mr. Glaisher and I descended at Newhaven in this style, two miles in four minutes, after letting nearly all the gas out; and in that most terrific of all recorded drops, when Albert Smith and myself being in the car of Mr. Gypson's balloon, in the year 1847, we ascended from Vauxhall Gardens, I was the means of turning the balloon into a parachute, which saved our lives.

Professor Baldwin has made, up to the time I am writing, nineteen descents, and is pre-eminently smart and fortunate.

PROFESSOR BALDWIN'S PARACHUTE. [*To face p.* 22.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CHAPTER II.

IT being impossible for me, in this second part of my life, to do more than select a few out of the hundreds of trips I have made, it is impracticable to avoid a certain amount of desultoriness, owing to the hap-hazard selection of the most interesting experiences I have undergone.

One of the counties I visited, in 1857, was Devonshire.

I left North Woolwich about eleven o'clock at night, and got into Tavistock soon after daylight next morning. When it is considered that the distance is nearly 250 miles, it may, perhaps, be surmised that I was fortunate in catching an express train, but in those days "flying Dutchmen" were not invented, and even now, while wonders of travelling are of an every day occurrence, there is a limit to the power of steam. As a matter of fact, however, I travelled through the air by balloon, and the duration of the aërial voyage being so very much in excess of the customary trips in balloons, I will narrate the experience which afforded me and my fellow travellers

A NIGHT AND MORNING SURVEY OF SEVEN COUNTIES.

It was on the 15th of June, in the year 1857, that I was engaged to ascend from the Pavilion Gardens, North Woolwich, but, as wind and weather did not favour the

undertaking, a postponement was talked of, especially as the inflation had to be managed a mile away from the Gardens, close to a new and capacious gas holder. In the river Thames, which was only a few hundred yards distant, the water was very rough, spray dashing over close-reefed vessels as they sailed down Woolwich Reach, while the smoke emitted from the Arsenal and Dockyard chimneys, formed long inky streams, more inclined to go down than up; small boats did not dare to venture across the river, for the angry wind swept over the marshes and seemed to roar forth a note of warning. It was no fit occasion, to expose a balloon, distended with gas, to the full fury of the gale, with the risk that it would be blown into ribbons before it could pass over the trees which formed the boundary of the Gardens.

This being the kind of day, I resolved to await the turn of the tide, and be ready to avail myself of a lull; no matter how late the ascent, it would never do to disappoint the visitors *in toto*.

Sure enough, at 7 p.m., a chance presented itself, and the word was soon passed, all being previously in readiness, "to turn on" the gas. The filling occupied only an hour-and-a-half, but when inflated the machine was nearly unmanageable, and it was no easy task to let it up gradually with ropes so as to escape the trees, and had not an encampment of gipsies outside the gardens rendered assistance, the breeze which still blew hard would have been too much for us.

Once within the sheltered haven where all was made snug, our anxiety as to the possibility of ascending was

allayed, and before it grew quite dark we were at anchor in the enclosure, while a display of fireworks was quickly improvised, and it was announced that it was to be a night ascent; so at 11.30 p.m. Mr. Henry Youens and Mr. J. Allan joined me in the car, and in the midst of a royal salute away we bounded, cheers, fireworks, and good wishes greeting us and blending as we shot across the river, when the lights of Greenwich were soon under us, and ahead, was all London in a blaze of gas light. Passing over Kennington Oval, Vauxhall Bridge, and Battersea, we next heard a Scotch polka being played in Cremorne Gardens.

It was barely a few minutes later when Richmond was descried, and as the upper breeze remained fresh, we held consultation as to whether we should go down or keep up until daylight broke; I pointed out the risk of the former alternative, and for my own part, I was glad that my companions agreed to go on, as a landing in the dark is not one of the delights of ballooning.

During the darkest part of our travel we heard the midnight hour strike, and this induced us to look about and make sure that we had not reached some sea-port; as, if it were so, the bells might be the last we should hear, for if once we were blown towards the sea, the broad Atlantic was in front, a fact which made us search diligently for land marks.

Although we could detect scattered lights on the sombre landscape, still we were not at all sure as to our distance from the coast.

"Listen," I cried, "I heard surely the crying of sea-birds."

A pause ensued, while we noticed lights looming unde

the haze, which at times resembled water, and a tail like that of a comet was to be discerned; beyond was a black patch of considerable size, but the colour outside of it was of a lighter tinge.

"That is the Isle of Wight in the distance," I explained, "and the tail is the water from Southampton; we have passed it now, and are wearing more south. Can you see to read the Aneroid, Youens?"

"Impossible, too dark for that."

"Throw out paper then, and note whether it goes up or down, we are over seventy miles from London already. I would rather not open the valve unless we are compelled to land."

Pieces of light tissue paper were found to be rising upwards, a certain sign that we were sinking, which would have been noticed sooner, had we been able to read the barometer.

We had no Davy lamp, and very little to refresh ourselves with, as this was not a premeditated journey, so that we were unprepared for a chapter of accidents.

It was most advisable then not to cease peering about until we could obtain more exact evidence as to the probable distance of the coast line. We were evidently wearing in a more southerly direction than we expected.

At one time we were hoping that the balloon would stand in more towards Bristol, but now that we seemed to be leading away lower down, it would never do to rest until more clearly defined marks presented themselves as to the distinction between land and water.

As the balloon had been slowly descending for some

time, we had to avoid a close contact with the earth, and very careful "jockeyship" was requisite not to touch land with an unexpected bump. There was no trail rope in the car to relieve us of a certain amount of weight, but we managed exceedingly well. The hedge-rows and field boundaries were immensely serviceable.

"Look out there, pay away Allan, let her have it; don't you see that wind-mill? Out with more ballast Youens. I have myself a large bag in reserve. Steady, she is more than a couple of hundred feet above the shafts. My word, and don't they go round sharp?"

Fortunately both my friends though amateur aëronauts were cool and experienced, indeed Mr. Youens has since that event taken to the "profession," while poor Allan has gone over to the majority.

Events were becoming somewhat alarming, but an upward tendency was imparted to the balloon by a free discharge of sand, and as there was now a gleam of light in the eastward, we made the most of it, and could see a difference in the colour of what met the eye further south. This we took to be the water which was certainly too close to be reassuring, but we were scudding along just then in a line almost parallel with the darker coast ridge; still a spice of uncertainty surrounded our movements, and pleased enough we were as more light broke upon the scene, for we had been getting nearer to the water while drifting over habitable places in which no one seemed to be astir. The feathered tribe had already set an example as to early rising; listen! don't you hear—

"The lark
Shrill voic'd and loud, the messenger of morn,
Ere yet the shadows fly he mounted sings
Amid the dawning clouds, and from their haunts
Calls up the tuneful nations."

And is it possible that we heard so distinctly what passed below?

Yes, at our elevation we did, as we were not more than 1,700 feet high.

We had passed Dorchester, and were mounting up for another curve, but had to check the soaring tendency of the balloon, for on crossing the river Exe, we were not so very far from Sidmouth and Torbay.

On the silvery river with Exeter on our right, a small sailing craft was seen.

"Boat ahoy! How's our course?"

"You will have Plymouth on your port bow."

Waving our acknowledgments, we began to pass over the uplands, and allowed the balloon to rise as the land jutted out seawards, and we were going over a vast mass of uncultivated land, amidst which we recognized Dartmoor, and the prison; here, as our anëroid could now be read, we found that we had risen to an elevation of over 8,000 feet.

We could see the Bristol Channel and the narrowing land. At the next dip, after clearing the moorland, we resolved to alight, and found a favourable spot within a mile and a half of Tavistock. The grapnel caught in a tree close to a farm house, but a solitary workman seemed so scared with the *comet*—as he considered it, there being one due—that he fled behind a hedge when we called upon him to hold on.

Mr. Youens alighted and went after him to know our whereabouts and brought him in by main force, more than persuasion, as the looked for comet, and its supposed arrival, had taken a large share of the man's physical power out of him. He got slightly better when we explained what it really was, and he agreed to go to Tavistock for a conveyance after he had seen the colour of our cash and taken some of it with him to prove that it was not counterfeit coin.

When he started, the gas was let off, and the balloon was allowed to dry in a flat state on the greensward.

The messenger, on returning with a van, as he looked above the ground, and not on it, could see no balloon, and he bethought himself that the powers of darkness were holding their revels, but he was soon undeceived and lent us a hand in packing up and getting into the town.

The shops were not open, but we knocked the people up at the Bedford Hotel. The landlord, Mr. Northway, hardly liked the look of us, and when he was informed that we left North Woolwich at 11.30, about five hours previously, he shook his head with an amount of doubt which was increased after we ordered breakfast.

"I shall have to trouble you, gentlemen, for the cash in advance," said a young person who had probably been roused up before her regular time.

The suspicion created by our early and unusual visit was not easily allayed; during the time we were enjoying a substantial meal with plenty of clotted cream on the table, the hotel became crowded with the Tavistock people,

and we were asked, on going below, if we could offer any decided proof of having ascended from the spot we named.

Mr. Allan pulled out the return half of a railway ticket from Bishopsgate Station to North Woolwich, on it was the 15th of June, "And you know," he said, "we have not long entered upon the 16th."

"That ticket," he added, "I took yesterday afternoon without knowing that I should accompany Mr. Coxwell, much less that I should be down here."

This had the desired effect and we were pressed to stay, but we got on to Plymouth as quickly as possible, and sent off a telegram (the invention was then in vogue), so that the next issue of *The Times* had in it an account of our doings and the public learned that we had not, as was supposed, "perished in the sea."

THE DERBY ARBORETUM FESTIVAL

was the next affair I had in hand, and as this great anniversary in the midlands came off a few days after the voyage into Devonshire, I had enough to do to get down in time.

Splendid weather attracted an immense assemblage of visitors, who came by rail and road from Birmingham, Sheffield, Chesterfield, Lincoln, Newark, Nottingham, Leicester, Loughborough, and intermediate stations. Altogether about 30,000 persons assembled. The musical attractions were great.

Fortunately Colonel Bentinck, of the 7th Princess Royal Dragoons, having just arrived at Sheffield, permission was given to the splendid band of this regiment

to attend. Nicholson's full band from Leicester, including the principal soloists of His Grace the Duke of Rutland's, and the Yeomanry bands and the fine band of the 1st King's Own Stafford Militia were present, also the drum and flute band of the 1st Derby Militia, and the band of the Midland Railway Company; then there were glee singers, under the direction of Mr. Farmer of Nottingham, who helped to gratify the listening throng. Two Russian cannon presented and inaugurated at the Arboretum grounds were likewise objects of much attraction. I had provided, besides the balloon, some aërostatic novelties, including a parachute descent, balloon races, and a gigantic figure of a man, the latter furnishing much amusement to the juveniles, and a fund of merriment, tempered with fright to some of them, when he dropped down and stepped across the fields with giant strides before he was captured.

I had with me, when the great ascent took place, only one passenger, viz., Mr. Foster, of Derby. Another very corpulent gentleman offered himself, and suggested also that he should be thrown out as ballast in case he was too heavy.

The descent was made in Chaddesden Park, the seat of Sir H. S. Wilmot, Bart.

CAUGHT IN A THUNDERSTORM.

On a second ascent from Chesterfield, when Mr. P. Goodwin, of Macclesfield, and Mr. E. Turner, of Sheffield, accompanied me, we were carried into the midst of the gathering clouds, which began to flash vividly, and in the end culminated in a storm.

There were indications before we left the earth as to what might be expected; the lower breeze took us in another direction as we rose, but a gentle whirling current higher up got us into the vortex of the highly charged clouds.

These are situations which put one's theoretical notions most severely to the test. And assuredly this was the case, as we had to prove by absolute experience whether the balloon was insulated and a non-conductor.

An unexpected flash of lightning, followed by others, with thunder claps all round you, does not fail to enforce the lesson that "discretion is the better part of valour." Nor were we at variance in coming to this decision as it grew darker and came on to rain. What with the pattering of huge drops on the top of our canopy and the dazzling flashes that followed, we availed ourselves of a good opportunity to get out of it by landing at Ashover, after being up about three quarters of an hour.

A thorough drenching while emptying the balloon was a natural consequence, but, as may be supposed, we took this in good part, rejoicing that it was no worse.

SHEFFIELD AND LEEDS.

After several exhibitions of my balloon signalling at the Newhall Gardens at Sheffield, and numerous ascents, I went again to the Headingly Gardens at Leeds, Mr. Thomas Clapham, the lessee, being a most enterprising man. We had, in addition to the ascent, Lord Cardigan's charger on view—not in my charge aloft, be it clearly understood, but under the care of Corporal Rigby, who seemed proud to parade this fine, spirited chestnut horse, and to explain that

it was the one his lordship rode at the memorable Balaklava Charge, where the corporal was also present himself.

To keep faith with my engagements at Sir Thomas Maryon Wilson's seat, I next was called upon to hasten south, as there was to be a *fête champêtre* at Charlton House, near Woolwich, in aid of the Royal Kent Dispensary.

Here I was kindly received by the late Sir Thomas Maryon Wilson and the late Mr. Carttar, Coroner for East Kent, who officiated as Secretary, and who had himself been up with Green, and took a great interest in aërostation, as did his son, the present coroner, who was then quite a young man.

There was nothing very remarkable about the ascent, beyond its having taken place under difficulties, as many hundreds of yards of gas piping had to be brought into the park from a main in the high road, which involved great expense and trouble. The fête was in every respect a success.

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Away north was the next movement made, but I cannot attempt to allude to more than a very few of the undertakings with which I was connected. I well remember that I had an urgent request to get back home with all speed, as I was wanted for the

EXPLORATION OF AUSTRALIA WITH BALLOONS.

The Times had published an article on this proposal, not in reference to me personally, but to the subject, and Mr. George Coppin, the Australian manager, had arrived in London with his head full of ballooning among other things.

Before returning to Melbourne by the Overland Route he had given proof of the interest he took, not only in the drama at home and abroad, but in all kinds of scientific novelty.

He had started the Cremorne Gardens at Melbourne, and he aspired to display his energy by taking me out with him regardless of cost, as he said, to initiate antipodean experiments, preparatory to fostering the idea of aërial exploration.

I had engagements at the time which prevented me from accepting his offer "to stand not," as he put it, "upon the order of—leaving the old country—but to go at once."

This was energetic and persuasive, but I could not see my way to start. I agreed, however, to build a new balloon, and to supply another, as well as an assistant aëronaut.

This gentleman, Mr. C. Brown, went out and made a number of successful ascents, but the exploring expedition was never brought to a practical issue, nor, by the way, do I believe that it was ever gravely attempted.

After visiting Nottingham, Leicester, and several other towns, I went to Hull, and was there identified with a novel kind of gala at the Zoological Gardens of that town, which was alluded to in the local and London newspapers in a jocose strain. There were in attendance

500 VENERABLE VISITORS,

all of the tender sex, and none of them were less than three-score years of age; they enjoyed a liberal tea, provided by Messrs. Wolfenden and Melbourne, the then

proprietors of the Queen's Theatre (now long since dead); *I* was persuaded, and there is no harm in mentioning it, to be present in the dancing-room at what was styled a preliminary spin among many of these active old souls.

"I should like to go up with you," said one, "but I suppose there's no chance; anyhow I'll have you on the 'light fantastic toe,' and catching me by the arm, I was led forth captive, and had to assume a gallantry which amused these elderly ladies, who afterwards surrounded me in the inner circle where they were prominently placed some time before the ascent.

The élite of Hull were present, and appeared to be delighted by so many happy, and well behaved visitors from a humble station in life.

Later in the evening, more dancing was indulged in, and many young couples were put to shame by the elastic movements of the elderly ladies. This last saltatory display was after the dear old souls had taken tea, but whether the smallest possible quantity of anything *qualifying* had been placed at the disposal of those who were not strictly abstainers, I cannot say; I recollect hearing that one or two, after partaking of the "cup that cheers," *did* bound and curvet about with amazing agility, but no sensible person thought the worse of them for this vivacious outbreak of animal spirits. Of course, the bulk of them were long past enjoying a lively skip at a public garden treat, and for aught we know it was the last chance and flutter of the few who availed themselves of making the most of time present.

Mr. Melbourne and Mr. Huby ascended with me, but

as bad luck would have it, one or other of them having had an order to put out sand, did so rather too suddenly, and the ladies received the contents of a bag when they were least prepared for such a compliment.

It came on hazy after we left, and for a while we were ignorant whether our course was up or down the Humber, whether, in fact, we were bound for sea or were going inland. As it happened, we pulled up near the river bank in a fog that came on.

"No doubt you could see the broad water just in front of you," said a fisherman on the sea wall.

I declined myself to reply, as we were not, in truth, aware of our position, we could scarcely see the trailing of the grapnel, but ignorance of that circumstance being bliss to us, I kept a still tongue, and, as the voyagers were intent upon returning, as quickly as they could, to their old ladies, I escaped the ordeal of being further questioned, so that we, one and all, consoled ourselves with the capital saying of old—"All's well that ends well."

ASCENT BEFORE THE QUEEN AND PRINCE CONSORT.

Another anecdote of this heterogeneous mixture of mere chat about ballooning must be introduced even at the risk of incurring the displeasure of the *savants*, who will exclaim, "But all this is not purely scientific." "No," I answer, "nor did I ever promise or attempt to provide a treatise of that description;" I shall have, however, by gradual strides to become more sedate and philosophical. Meanwhile we will revel in the unscientific, and speak of Royalty.

I have alluded sparingly to this part of my experiences, but it has been my lot to look down upon many crowned heads, as well as to have looked up to them, the moment I re-stepped upon this planet, after so often getting away from it.

It is to an exceptional incident connected with the Royal progress through Warwickshire, that I now refer, and at this point it may be as well to notice that there are some who like a near view of Royalty, and who feel that the housetop is rather too far off for feasting the eye upon Royal lineaments. On the other hand, there are persons who prefer a bird's-eye view, to a good close stare.

I will leave undecided this question. At any rate having built a new balloon, and being invited to attend at the Jephson Gardens, Leamington, I did so, hoping that the procession could be seen in detail, so as to take it in at first from a limited altitude when held by a rope, and afterwards in one grand *coup d'œil* or panoramic view.

As Her Majesty and the late Prince Consort approached, the balloon "Queen," with the name in letters five feet deep, rose from the lawn near the high road.

At once this imposing feature received the marked attention of the Royal party, and of the whole gazing multitude. Her Majesty graciously bowed recognition, and pleased enough was I to be able to get aloft in time, as the last section of the balloon had been joined in a surprisingly short space of time, and I could give only one coat of varnish to it, so that it was not altogether gas tight, as the sequel of the great day's doings will show.

On the disappearance of the procession, the inflation, which had not been completed, proceeded, until 34,000 cubic feet of gas, supplied from the Leamington Works, had entered.

It was intended, during the afternoon, to repeat the partial ascents, but a storm came on, and so greatly increased the weight of the balloon with heavy rain, that it was with difficulty that the final ascent took place, and had it not been for my determination to run a great personal risk, failure must have been the result.

The Parish Church happened to stand in direct line with the course which my balloon was certain to pursue, and it was not very far away. Heavy rain had so soddened the thinly varnished fabric, that, on testing the power, I found that I should have to go alone, and without ballast or anchor.

As there was no time to lose, and matters were not improving, I cast loose, and was all ready to duck low in the car in case of a collision, which took place just as I had raised my head above the rim of the wicker protection.

For a moment every spectator looked on with alarm, and many shrieked, as the balloon rebounded and again closed with the spire, and scraped up towards the top, where, only a few days previously, had stood a large weather-cock, which, fortunately for me, had not long been taken down for re-gilding.

Having waved my cap as a signal that I considered, after a hasty inspection, that there was no rent, I had a deafening cheer.

The "Queen" now rose splendidly, as if destined to

surmount every obstruction; but high up, the lightning flashed and the thunder rolled, still the balloon passed on unhurt, and I was able to make a safe landing near Chesterton windmill; but, owing to the want of ballast, and the absence of a grapnel, I had a rough, dragging landing, and for a time could get no assistance.

At the nearest farm house I found that everybody of much consequence had gone to see the real Queen, and the procession, so that *my* Queen, after descending from her aërial throne, had no admirers, save a party of gipsies; these however, though of equivocal appearance, proceeded to get one of their small traps, though it was barely strong enough to carry the balloon, which weighed at least four cwt.

"You are a long way from the high road," said the chief spokesman, who had a horrid cast in one eye, and a nasty glare in the other.

"Well, go and fetch whatever you have," I said.

I was not sorry to be left alone for a short time, as it suddenly came to my recollection that I had more money about me than I considered it safe to carry in such company as that amongst which I had been thrown.

I had just time to put a cheque and some gold in a sand bag and tuck it safely down beneath the compact folds of the balloon. In my waistcoat pocket I discreetly placed half-a-crown, which done, I detached the liberating trigger from the hoop and located this formidable piece of iron mechanism in my coat pocket, then I concealed from view my knife with a long blade; while these operations were in progress, three gipsies came back with a grey pony and a rattle-trap affair, which had to go over muddy ruts and up

a country lane, and while we were in this lonely part, the trio came much nearer to me than I cared about, and spoke about terms.

"What is a fair charge?" I asked.

"Well, fifteen shillings won't hurt you," was the reply.

"If I had that amount about me," I said, "you should have it, but the moment you get me back to the Gardens at Leamington, you shall have that, and something besides. The truth is, I came away in a hurry, as a storm was imminent. Look here," I continued, "I have half-a-crown, which we will spend on the road, and I guarantee you a good supper, and one of Her Majesty's golden coins to the tune of a sovereign, when I see the manager of the gardens."

When once we got out of that long lane and trod on the high road, I felt that danger had decreased.

At last we sighted a roadside house, and there I sent them in to change the half-crown, and get what they liked while I looked to the pony and my luggage.

"You had better drink with us," they said, and as all three waited at the door, I thought it expedient to do so.

They handed back some change, a considerate act for which I was hardly prepared; "perhaps," I thought, "I am doing these queer looking people a great injustice;" and when we arrived, I had reason to know that this was the case. However, my ballast bag was withdrawn from its place of safety without their perceiving me in an act of which I felt ashamed, and my ungenerous suspicions were followed by the good supper and payment I had agreed to make after the balloon had been deposited in safety.

CHAPTER III.

INTERESTING TRIP FROM CHESTER.

THE spot from which I started was a paddock at Gray Friars, and I was accompanied by Herr A. Vogel of Berlin, Mr. G. Haswell of Chester, and Mr. J. B. Marsh.

Exactly at twenty minutes to eight we were

> "In happy freedom, pleased to feel the wind,
> And wander in the luxury of air."

The view of the city was very fine, and the passengers were called upon to note several different scenes, all of which were interesting. We appeared to have scarcely risen above the houses, before, like a picture, the Roodee, with its white tents, the walls thronged with people, the castle with a crowd in front of the grand entrance, the beautiful tent in the Linen Hall, the New Bridge, Curzon Park, the Old Bridge, Causeway, and the Circus Tent near St. John's Churchyard, all lay spread before the eye.

The appearance of the streets was droll; the houses looked as though the roofs had been cut off and stuck upon the ground, nothing could be seen of them except the slates and chimneys. St. Peter's Church, the Cathedral, St. John's, and other churches appeared very much diminished in height.

We ascended rapidly from the moment of starting, the wind blowing from the W.S.W., and in three minutes the "Queen" attained an altitude of 3,000 feet, the hum of the noisy city was then altogether lost, and as we passed over the railway station, the town of Chester faded in the distance.

Having produced several bottles of ginger-beer, I gave a toast, "The 'Queen,' may we ever be loyal in our hearts, for though above her subjects and her laws, we are still under her protection and guidance."

The toast was drunk with the customary honours.

In the perspective now gazed upon and much enjoyed, it was more difficult for my companions to identify the places immediately beneath us, than those several miles distant.

The Cheshire, Derbyshire, Denbighshire, and Flintshire hills appeared to be diminished in size, and a mountain on our extreme left, which seemed to overhang the Irish Channel was readily seen to be Snowdon—the monarch of Wales.

A more glorious sunset I never witnessed; the sky was flecked with golden and purple bars, which intermingling

"came blushing o'er the sea,"

and catching the tops of the silent mountains, were reflected in the clear sky, to be again mirrored in the Dee and Mersey. Far out beyond Liverpool, the same glowing light glistened upon the sails of vessels which would otherwise have been invisible, making them seem as though they were so many beams of sunshine standing like arrows in the water.

Suddenly the sun became obscured, the gas in the

balloon was condensed, we were then close upon Helsby Hill, and ballast was cast out, that we might see what land lay beyond.

Looking to the right, we saw Beeston Castle, rising like a hump out of the beautiful "Vale Royal."

In front the forest of Delamere was seen in the deepening twilight. The canal looked like a silver eel as it wound its way through the fields and amongst the trees.

With regret I lowered the grapnel to aid us in the descent, which was made in a field belonging to Mr. William Nixon of Alvanley.

The bewildered but delighted country people assisted in packing up, and one man remarked, "Oive never seen sich a string of fokes sin there was bull baiting at Acton."

Although I had sold my war balloon to Mr. Coppin for Australian service, I still clung to my earliest idea of signals for military objects.

It so happened, however, that this Chester ascent, led me into a train of thought which afterwards ended in a discussion about vertical and long range sight-seeing as applicable to warfare.

At this time (1858) the English Government and British officers generally regarded the balloon-and-signal theory as wild, preposterous, and impracticable; it might do very well as an exhibition, but the idea of parading such things among the ranks of an English army!—and yet it has been *paraded*, if I may emphasize that word, by the course of subsequent events: however, I do not propose to record an individual opinion about the latest

experiments in the army, but merely to jot down the conversation of three persons as they discussed the matter thirty years ago.

DISCUSSION ABOUT WAR BALLOONS.

Mr. A.—I heard this morning from one of your companions of yesterday, that when you looked over Helsby Hill to note what was on the other side, you said, "What a sight for a general or an engineer officer."

Mr. B.—That was to see what was out of sight, I'll be bound.

Mr. C.—Rather to know what could not be ascertained without the help of a balloon, the value of which I was thinking about at the moment of my exclamation—of course I mean in a military point of view, and what advantages might accrue if my proposals should be adopted.

Mr. A.—What *have* you suggested?

Mr. C.—To employ balloons in the English army for reconnoitering, signalling, and, under proper supervision, for destructive purposes.

Mr. B.—My word! that last is a peppery notion, but, excuse me, might you not have to take something hot yourself, a few ounces of lead for instance?

Mr. C.—My plan for dropping shells could be managed without anyone being in the balloon. A bird's-eye view could be obtained, for all practical purposes, a mile or two from the front; had you been up with us yesterday, you would have been astonished how far we could see with the naked eye. Of course, good glasses would assist to bring the enemy closer.

Mr. B.—Personally, I should prefer keeping at a

respectful distance; and then, how about the long range and these new rifles; only fancy bullets as thick as duck shot flying about.

Mr. A.—That danger has been disposed of, Mr. B. The way to avoid that would be——

Mr. B.—By judicious retirement, I should say.

Mr. C.—The preservation of the balloon would be of primary consideration.

Mr. B.—And the preservation of those in the watch tower only secondary, I suppose?

Mr. A.—Really Mr. B. you are too incisive by half.

Mr. C.—Not at all; the way your friend puts it affords scope for explanation. As to risk, one can never be so free from it in warfare as Mr. B. for instance, might desire, and as military science progresses, dangers will not probably diminish.

Mr. B.—Don't mention them, it is bad enough to be shot on the solid earth, but to be brought down like a bird after doing double duty!

Mr. A.—What do you mean?

Mr. B.—Mean! why by acting as a soldier and a sailor as well, by being on duty below and up in a balloon besides. I should expect double pay for that game.

Mr. A.—But the aëronaut does not consider that it would be desirable for officers or their men to go up.

Mr. C.—If it comes to anything, I feel sure that there will be no lack of aspirants in that way.

Mr. B.—*My idea* is, that many will funk it. Why, balloon-men must be born such, like poets, and cannot be made to order.

Mr. A.—How do you know, Mr. B.?

Mr. B.—Well, I offer an opinion that's all, if I am wrong Mr. C. will soon put me right.

Mr. C.—You infer, I presume, that to make competent balloonists, time and proper instruction are requisite, especially as regards experts.

Mr. B.—I mean, dear Sir, that even these combined will not always turn out an able pupil in your line, unless a man has his head, so to speak, screwed on specially for ballooning, which, to my way of thinking, is work for which very few are fit.

Mr. A.—Do, my good fellow, keep your private opinions to yourself; you are soaring a bit up Mr. B.; why don't you come to the point and ask a question which seems to me the most vital of any yet propounded?

Mr. C.—What, pray, is that?

Mr. B.—Ha! there you are; and where are you now friend A.?

Mr. A.—Well, I'm not off the ground, but should be glad to know how a balloon can be sent up without gas.

Mr. C.—It can though. The first balloon was raised by heated or expanded air. The second kind of balloon by hydrogen gas, which is much lighter than coal gas.

Mr. B.—And costs more, besides probably being difficult to obtain when wanted.

Mr. A.—You speak like a practical man now, Mr. B.

Mr. C.—I endorse that compliment, and beg to add that rarified air balloons can be sent up anywhere under favourable atmospheric conditions.

The French used balloons, as you know, during the

BALLOONS USED BY THE FRENCH DURING THE REVOLUTIONARY WAR. [*To face p.* 46.

Revolutionary War, and they were filled with hydrogen. I hold that it is possible to convey any gas in india-rubber bags of an elongated form, and the day may arrive when it can be moved about in a much smaller compass, just as a chamber of an air-gun contains air that has been pumped into a small space. But we know enough already to start with, and the English have a precedent to go by, viz., actual performance by the French; at any rate, it is what I have for some years pressed upon the attention of the authorities, but whether we shall ever adopt it at home or abroad I cannot say; but if the French or other nations revive the experiment, we are bound to follow.

Mr. B.—Yes, and more the shame that we do not lead; there is plenty of originality in this country, if you can catch the eye and get the ear of those who govern us.

Mr. A.—But, my dear Mr. B., what is the use, if they shut the one and close up the other?

Mr. C.—We must not be altogether discouraged; time works wonders.

BALLOONS AT THE CRYSTAL PALACE.

First ascent in the year 1859.

My balloon "Queen" having made her mark in the Provinces after the approving eyes of Royalty had looked upon her, was now sought after to assist in inaugurating ballooning at the Palace Grounds.

I had been asked for some time to do what I could in this way, and to make inquiry as to the facilities for an inflation; fortunately a friend of mine, Mr. Magnus Ohren, Secretary of the Gas Works at Sydenham, took a lively interest in the proposal, and was well qualified in this

respect, as he had officiated, and simplified matters
Hamburg, when I took up Prince Paul Esterhazy. H
assistance materially simplified this fresh attempt, in whi
there were certain difficulties to surmount, and a
unavoidable expenses to be incurred on the part of t
General Manager of the Crystal Palace; it was just he
as may be supposed, where the Directors hung fire.

Meanwhile, the refreshment caterer, who was about
have a benefit, thought he would try an ascent with
smaller balloon, borrowed from Cremorne Gardens.

Mr. Lythgoe, the aëronaut, was sent to try what co
be done by using such pipes of small dimensions as w
already laid down, and he succeeded in making an asce
so that Mr. Strange opened the way for the introduction
larger balloons, and when once a trial ascent had come
with flying colours, the late enterprising Mr. Boley
not slow to profit by it.

My first ascent in the year 1859 passed off withou
hitch, and this was soon followed by others, which I h
no desire to refer to in this book, unless I find someth
extraordinary in the features of them, and such as will
a fresh link to the chain of novel incidents for those w
delight in adventure, and for those who desire to obse
the practical results to be ascertained from a few of
various experiences.

THE BALLOON "QUEEN" IN A STORM.

This occurred during that remarkable gale in which
"Royal Charter," steam vessel, was lost.

It was a fine autumnal day when proceedings co
menced and the weather forecasts did not publish

cause for alarm during the preceding evening or early morning.

The barometer was falling somewhat, and, most probably, like many a mariner, misled by outward appearances and a tranquil atmosphere, I had not watched it so attentively as I should have done.

I have so often started in a boisterous wind that, as I thought, there was nothing whatever to prevent the filling of the balloon, indeed the auspicious outset, so far as regards the inflation on such a remarkably still morning, was a source of comment among those engaged in the work.

I was induced, owing to the promising and calm state of the atmosphere, to go in to luncheon, but my old friend Mr. Ohren, agreed to remain and keep an eye on the men and the balloon during my absence.

I had not finished taking refreshment, when I espied one of the gardeners anxiously seeking me, and learnt, most certainly to my surprise, that a brisk wind had suddenly sprung up, and that I was wanted at once, as the balloon had torn away the hose from the gas pipe, and was dragging the men and the bags among the shrubs and trees where they were unable to control its movements.

Fortunately I arrived just in time to rescue it from impending destruction.

While in this dilemma an official, guessing at what my tactics would be, cried out, "Pull away all of you, we will soon drag her back."

"Halt," I cried, "do nothing of the sort, if we go on that way as she now is, in less than a minute she will be torn, and soon flat on the grass."

The first step of the right kind was to take in a couple of reefs, as the sailors say, as there was a large surface of spare loose cloth acting like a sail, and it was, in reality, this which the wind had acted upon, more than the inflated bulk of the balloon, which I left snug; but the men had been too liberal in slacking out the netting, and the error had to be remedied by undoing the mischief, mesh by mesh. This could not be done in a minute, but when once accomplished, after going round and round taking in two meshes at a time, the balloon was much steadier, and we managed then, by an oblique course, to get her under a row of trees which appeared to offer shelter, but here the shifting wind found us out, so that I decided upon continuing the inflation, in order to be ready to start at the appointed time.

But the last and most violent set of the wind revealed a new and apparently insurmountable obstacle in the North Tower, straight for which we were likely to go, unless the most difficult and dangerous step was taken of pulling the balloon lower down the Archery Ground, right in the teeth of the wind; but eventually this plan was adopted as a desperate necessity, when Mr. Chandler, who had paid before-hand for a seat, now refused to take back his money. I strongly advised him to go another time, but he was not to be disappointed, as he said, in that way—if I could go, he could.

"Well, if that's your argument, jump in, but I would rather go alone."

There being no time to lose, I pulled the catch, after giving a considerable amount of ascending power.

We passed over Sir Joseph Paxton's residence, steering frightfully close to the Tower balcony, when we made a vertical spurt in obedience to another outfall of sand.

We knew by a ringing cheer of congratulation how that crisis had stirred the spectators in their inmost feelings.

The car was apparently trailing behind the balloon with a pendulum swing, which is not often the case. In less than two minutes we entered the lower clouds, passing through them quickly, and noticing that their tops, which are usually of white, rounded conformation, were torn into shreds and crests of vapour.

Above these was a second wild-looking stratum of another order.

We could hear, as we hastened on, the hum of the west end of London, but we were bowling along, having little time to look about us, as the grapnel had to be adjusted so as to suit the occasion; some extra sandbags were turned to a good account by making a bed of them at the bottom ends of the car which we occupied, in expectation of a rough landing.

As it came on to rain hard, we were agreed that the sooner we descended the better it might be for us.

On breaking through the clouds we noticed how fast the fields appeared to be rushing past, which meant how quickly we were scudding over them.

Practically it is of importance to grasp this illusion and to spot the place where it is desirable to stop, although in strong winds an aëronaut may be much deceived in his calculations in this respect.

While making for a large meadow, with several trees in it,

of which it might have been possible for our grapnel to obtain a hold, we found ourselves too high by a hundred feet for a grip, but, owing to the speed at which we travelled, it would not do to be over nice or to be hesitating and fastidious in a selection; we were traversing the open country with only a few scattered homesteads round about, and there being one of the latter near, it seemed as if we should take a good bank and hedgerow at a sufficient distance from the farm to be safe; anyhow, we could not avoid trying conclusions with so good an anchoring ground.

Fortunately, on the first contact the grapnel did its work well, as I inferred by the shock which brought us up suddenly while going ahead at the rate of over sixty miles an hour.

"Hold fast, and stick to the car at all hazards," I cried, "and keep your eye on that barn, especially if we should break away when more gas is let off."

"What then?" asked my spirited companion.

I did not reply, but thought that some of our bones might have been severely tested, as we were at this time suspended like a kite; it was not so much the quantity of gas that kept us up, as the hollow surface of loose silk, which acted like a falling kite, and the obvious game of skill consisted in not letting out too much gas to make the balloon pitch heavily with a thud that would have been awfully unpleasant, but to jockey our final touch in a gradual manner, and yet to do it as quickly as possible, for fear of the machine getting adrift; since under the peculiar circumstances in which we were placed, it would

have inevitably fallen with a crushing blow which might have proved fatal, like poor Simmons' descent.

I never remember to have been in a situation when more coolness and nicety were required to overcome the peril which here beset us, while on that day the strong wind was, strange as it may sound, helping us to alight easily—that is, as long as the grapnel held firmly, and the balloon did not turn over like an unsteady kite.

To me it was a time of intense anxiety, while Mr. Chandler, though well down in the car, was smiling at not having had the least taste, as yet, of that rough work for which I had prepared him. When we gently touched the grass, and I threw open the valve to its full extent, we were tolerably safe, as there was not so very much gas at this time to let off, and we had been for some time suspended by wind; so we had a descent, as it happily proved, of less violence than I have frequently encountered, on a day when merely a fresh breeze was blowing.

Being wet through, we took shelter in a roadside inn, where I resolved to stay for the night.

My friend said he would rather go home just as he was, his wife not being aware of the kind of vehicle in which he had braved the storm. I advised him to telegraph and stay, but he went on, and took, as I heard, a very severe cold.

The landlord of the inn ventured to give me a little homely advice, and urged me to partake of a stiff glass of hot brandy and water.

I took the stimulant as well as his timely counsel, and then asked if he could oblige me with the loan of a suit

of clothes, and if he would order a fire to be lighted in a bedroom, as I seriously meditated drying my own clothes.

I intended also, but did not say so, to air the bed clothes, and when all this fussy indulgence of the phrenological bump of *caution* had been duly gratified, I went to bed, and was no worse for my aërial trip in a storm.

THE FIRST GALA AT YORK.

Before taking part in the Midland Counties Anniversary at Derby, I went in June, 1859, to the ancient City of York, where a gala on a large and unprecedented scale of grandeur was to take place, including flower and fruit shows, besides band contests, fireworks, and a balloon ascent; the whole was under the patronage of H.R.H. the Prince of Wales, the Lord Mayor of York, and most of the influential families in Yorkshire.

It had been anticipated that these united attractions would draw together such a mass of people as had not been previously witnessed in the country, and the committee of management were not disappointed.

The day was beautifully fine, but a strong north-west wind was blowing, an accompaniment which appeared to amuse the spectators, who watched the flapping of the tents and the buffetting of my balloon; but however lively such manifestations were to the excited crowd, to me they were a source of anxiety, as there was a row of lime trees rather near the place of filling, and I should have to go over them with a bound, or an intimate acquaintance might be scraped hastily which might not end in friendship.

There were many good points I did not fail to notice in

the arrangements of this gala which stood out in relief and contrast with others I had to do with in the Northern Counties. They had a smart field manager, who was obliging to me, so that there was hardly a want which was not gratified, and as to men for holding on, they were liberally provided in every sense of the word, judging as I did by appearances, which included the colour and expression of their faces, together with their gait and handling of the sand bags, which became less steady as the day wore on. This proved annoying, as it was just about the time that I depended upon assistance in checking the rolling of the balloon, which in all truth is sufficiently sweeping on a breezy day, without additional rolling motion on the part of the workmen through sheer inability to keep straight.

All the responsible officials, however, were most attentive, and there was one who ingratiated himself by his affable manners and thoughtful conduct, which was appreciated by me, if not by the unstable men whom I was unable myself to keep in order. Mr. Tom Smith, a well-known townsman, and quite a character in his way, appeared to exercise a wonderful power over them, which he exerted when once I had signified what it was I required.

Mr. Smith, by some kind of magic influence, which at that time I did not understand, brought them to their senses; the "Queen" at last was allowed to attain the height of her fair proportions, and seemed to bow gracefully her acknowledgments as she swept round over the heads of the people, causing them to stand aloof after many had lost their hats. Very amusing was this unex-

pected act of apparent familiarity on the part of her Aërial Majesty.

"Look out, she'll knock you down next turn," cried one of the men, who had already annoyed me exceedingly, and was giving orders to his fellow workmen; "let go all of you," he suddenly exclaimed.

Mr. Smith was now doing all he could for the best, and admonished this stupid, half-crazy Yorkshireman. At last I got in the car without thinking about or arranging for passengers, in fact, as it was my first ascent from York, and a windy day withal, I did not care about taking any, but Mr. Smith informed me that a friend of his would like to go, and as to himself, he would esteem it a great honour to be allowed to accompany me.

"You are better where you are," I said.

"That may be so," replied Mr. Smith, "but will you permit me to get in the car and assist you with the bags, I will get out if it is absolutely necessary."

Mr. Smith and his friend thus joined me, but we had great difficulty in getting that proper rising power which is so essential for a safe start.

That thick headed and mischievous workman, just as I ordered them to let up for the final test, facetiously exclaimed, "let go," which some of them did, and I was so annoyed that I let go myself, not the trigger, but my left fist straight for the nose of this dangerous assistant.

"Serve him right," exclaimed many voices, when the police dragged him out of the circle.

Mr. Tom Smith was so amused with this hasty lesson

in aëronautic discipline, that he indulged freely in laughter, saying, "you not only sent the man flying, but you knocked one of his front teeth down his throat;" "and serve him perfectly right," echoed several bystanders.

We then made another attempt to start, but what with the strong gusts and the stupidity of those who held the last connecting rope, a general roll over occurred. The moment a fresh chance presented itself I let her go, but as Boreas would have it, we were caught like a slow rising bird at a pigeon match, that is, we received a full charge just as we were taking wing.

Our car was quickly relieved of ballast to avoid a refreshment tent, but this did not clear her from the trees fortunately only the lower part of the balloon, with us in a crouched down position, sustained a very sharp contact, a pathway was cut through, and we then mounted rapidly, when Mr. Smith gave a lively cheer, which was answered by the spectators. I then sprang into the hoop and looked inside the balloon and saw that nothing was amiss.

Mr. Hudson was then asked to join us in replying to fresh shouts of encouragement, but it is not in every mortal after such an exciting start to feel thoroughly collected.

The view of York, as we crossed the Minster, was admirably calculated to revive the more undemonstrative voyager.

"Look up Mun," cried Mr. Tom Smith, as he scanned the beautiful City of York.

"I am looking down, Tom," replied the quiet one, "there is most to see below."

Mr. Hudson had not lost his wits, and pointed to several places familiar to both of them, as evidence that he knew very well where he was at that moment, though he confessed to a strange bewilderment during our passage through the tree tops, fancying, as in a momentary dream, that we were three wood-cutters hacking away for dear life.

The atmosphere being particularly clear, numberless objects of interest around us were visible to perfection. We could see the River Humber, and had a glimpse of the German Ocean; but, as our rate of travelling was extremely fast, we did not remain up very long, for there was almost sure to be a lively descent.

Mr. Tom Smith, with much good humour, insisted that the descent was an extremely well managed affair; he shrewdly remarked that it was not the going up he thought so much about as the getting down, and when I asked him for a clearer explanation, he added, "I am surrounded with relations. My brother has gone for a trap to take us back, and another for the "Queen" is being put to, and if my brother's horses are in as good fettle as they used to be, we shall lick the train, and report ourselves safe and sound before the last rocket has soared over the gala ground."

FATAL FALL OF AN AËRONAUT.

This disastrous event occurred, under very peculiar circumstances, at Newcastle-upon-Tyne.

A Mr. Hall, who had narrowly watched my movements at Sheffield, resolved to engage in the aëronautic art himself, and to try his hand at some of those athletic

A FATAL BALLOON DESCENT.

displays which had been introduced in London by foreigners, and are now being revived.

He succeeded at first, but in descending near Sunderland he was jerked out of his seat when the anchor took hold, and was so much injured in the spine that death ensued soon after the accident happened.

The Newcastle people had been very sympathetic, and I was called upon to ascend, as a benefit for his widow was contemplated.

This sad termination to a short career had a curious effect upon many of the inhabitants, who, in a somewhat old-fashioned style, had no sooner attended Mr. Hall's obsequies, than they divided themselves into two parties who contended against each other with much bitterness and personal hostility, as if some religious dogma was in danger of being examined.

The later indications of sympathy seemed to have been absorbed in the delights of mutual recrimination.

There was high discord when the announcement of another balloon ascent blew the fire among the slumbering embers, and this led to a fresh exhibition of animosity which could hardly be believed, unless by an observer on the spot.

On the occasion of Mr. Hall's ascent, the clergy and dissenting ministers, magistrates and county gentlemen and ladies attended in large numbers, and one gentleman who had patronised the exhibition afterwards became a violent anti-balloonist, attributing the accident to dangers which it was not justifiable to incur.

This party resolved to have no more of it in Newcastle,

and when it was announced that I was going up, a large amount of abusive fury was evinced by the anti-balloonists who were almost in a rabid condition.

It was ably and eloquently pointed out in the *Newcastle Chronicle* that the risk of ballooning was not so much in the undertaking itself, but depended exclusively upon the person undertaking that calling.

In support of this view the names of Charles Green and of myself were mentioned, and an appropriate extract from the *Aërostatic Magazine*, which I edited, was cited; this article bore upon the subject, and was penned many months before the melancholy event happened.

Despite all opposition my ascent took place, and the editor of the *Newcastle Chronicle* himself ascended with me. It took place on September, 19th, 1859.

A few extracts from Mr. Langley's impressions will be interesting, especially if I omit complimentary allusions to myself.

"The sun had set to the world below, but its light still tinged the western sky and threw tints of pink far to the east.

"An excited crowd pressed around. 'Stand back,' said Mr. Coxwell; and 'Stand back' was echoed by a dozen persons, who think everybody ought to stand back but themselves; and 'Stand back' was again repeated in the roughest Northumbrian by the police in large whiskers and plain clothes, and 'Stand back' was at last enforced by the officials in uniform.

"The great body of gas had drawn tight every string of the netting in which the balloon was encased, and one by

one the bonds which held it to earth were loosened, one rope only remained, and at the crack of a sort of trigger this tie was severed.

"In the same moment the balloon sailed into the air. We felt no motion, it seemed only as if the plain beneath us was falling away. There was no rush of air, no jolt, no consciousness of motion. A sea of upturned faces and waving handkerchiefs was seen but for a second, and the cheers were almost lost in the distance before the utterance was finished.

"There beneath, as if in some cloudy abyss, we could behold the sky reflected dimly from the Tyne, stretching far away to the west, where we witnessed the sun setting for the second time. The pink tints on the clouds had become doubly bright, and in every direction a panoramic view of indescribable beauty met the eye.

"Among the mass of slate roofs, which was nearly all that could be seen of Newcastle, except its lines of streets, the lantern of St. Nicholas and the monument to Earl Grey, the high-level bridge and the tallest objects seen from below were just visible, but looked singularly insignificant.

"All the lower parts of the town were enveloped in smoke, which seemed to grow more and more filthy and impenetrable as we attained a greater elevation.

"Meanwhile the panorama of the earth below seemed to be wound away like a scene on rollers beneath us, and everything terrestrial to the eye grew 'small by degrees and beautifully less.'

"The crowds became indistinguishable patches of black;

here and there were seen at great distances the red spots of light which indicate iron blast furnaces, while all adown the valley of the Tyne the smoke of Hawks, Crawshay & Co., the Walker Iron Works, and other chimneys, flowed like a stream, growing wider and wider towards the sea.

"From above, it resembled a huge white horse's tail spread out beneath.

"Through this veil of vapour, to the east, could be distinctly traced the locality of Tynemouth and North Shields, but above this stratum of smoke there was an uninterrupted view of country in every direction, such as could not have been obtained under any other circumstances.

"To the extreme north we could see Blyth 'sitting by the sea,' while more to the west Blagdon Park peeped forth, and nearer the bright reflection of the waters of Prestwick's Carr and of the lake at Gosforth were distinctly visible.

"On the west the high grounds of Blagdon and Winlaton seemed but a pistol shot, and peeping above the smoke of the coke ovens and firebrick works, the eye could clearly detect the summer-house on the hill of Stella.

"At the limit of the view on the south-west was a richly wooded and cultivated country, which resembled the Berlin wool-work once so fashionable among the ladies; while through it the Derwent and Team ran like threads of the brightest silver.

"To the south, Chester-le-Street, Lambton Park, and Houghton-le-Spring and the winding Wear were distinctly visible in turn; beyond these there was a black mist, and further still the towers of Durham's ancient Cathedral.

"To the east, the sea lay broad and blue, with specks here and there upon its surface, and now and again a light like a tiny spark.

"Above was spread a canopy of pure unspotted purple, deepening in its tone of blue towards the east; while on the west, the rosy tints of the sunset mingled with it behind the cumulo-stratus clouds.

* * * * * * * *

"At about a mile ahead of us, as we approached the earth near West Boldon, the aëronaut pointed out a green field, on which, he said, it would be prudent to land, and in that identical spot the balloon subsequently rested. Nothing could better prove how thoroughly this gentleman understood his profession, and how absurd it is to judge of the dangers of aërial navigation from the experiments of ignorant and incautious persons.

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"We returned to 'Canny Newcassel' with delightful recollections of our aërial trip, and the good folks with whom it had brought us in contact."

CHAPTER IV.

BALLOONS USED IN THE ITALIAN CAMPAIGN OF 1859.

THE Aërial Reconnaisance to which *The Times* referred and which I here subjoin, gladdened few hearts more than my own.

I began to think that the time would soon arrive when balloons would be used in the British army, as a successful ascent during warfare had been made by a civilian French aëronaut, and, historically speaking, it takes higher rank than any made by military aëronauts up to the present year of grace 1888, as it actually led to important results, as will be gathered from the following remarks :—

"Why is it," asked *The Times*, "that the Austrians, who can lose so valiantly, can seldom win?

"Because their knowledge is not of the present, but of the past. They are governed and directed by old hands and old routine. They have an enemy who does not care a centime for antiquity, and is not above taking the most irregular methods to win a victory.

"The Emperor of the French, representing the juvenile irregular school, in the most ungentlemanlike manner refuses to be surprised. Having recourse to a newfangled expedient which no trustworthy veteran, who can count his seventy years, would condescend to use, *he sends a man up*

in a balloon; and, at the expense of a few yards of silk and a few square feet of gas, is told the exact position of all those masses, which are drawn up so scientifically out of his sight with the intention of surprising him at the comfortable, leisurely hour of 9 a.m.

"The man of his time—the clever, active, shrewd, nothing-contemning adventurer of the nineteenth century—by dint of this small contrivance, becomes master of the position. He knows what is going to happen, and where his enemy is, as well as their numbers; and while the heavy, self-complacent Austrian is chuckling at the formal surprise that is to come off at 9 a.m., he commences operations at daybreak, chooses his own time and point of attack, and remains master of the field."

The correspondent of the same journal, who accompanied the Austrian army, wrote:—"How was it that the French were ready at six o'clock to make a combined attack against the Austrians, who, on their part, had but just taken up positions on the previous evening?

"An easy answer can be given to that question. No sooner was the first Austrian battalion out of Vallegio on the 23rd than a balloon was observed to rise in the air from the vicinity of Monzambano, a signal, no doubt, for the French in Castiglione. I have a full conviction that the Emperor of the French knew on the evening of the 23rd the exact position of every Austrian corps; that he made his preparations accordingly; and that on the other hand, the Emperor of Austria was utterly unable to ascertain what was the number or distribution of the forces of the allies.

"The above intelligence brings Mr. Coxwell into the field again. 'We gather from recent news,' writes that successful aëronaut, 'that M. Godard made an ascent to observe the Austrians; also, that forty women have been since engaged at Paris in making a new balloon for the French army. Ever since the Russian war, and during that event, have laboured hard in endeavouring to evoke the attention of our Government, our scientific men, and the Press, to the importance of aërial observations and balloon signalling. Balloons may, I think, be used with long wire ropes attached (kite fashion) without being let go, which might endanger their falling in an enemy's camp. Secondly—There is no real necessity that the balloon should be within close range of large or small shot. Thirdly—Hydrogen gas, by the decomposition of water, or by a novel process, would enable balloons to be inflated in whatever locality desirable. Balloons may also be made the vehicles of laying a temporary electric wire or thread in any direction required. A revolving drum beneath the car might be made to contain many miles of thin wire, so as to pay it out as desired. In this way, a network of communication could be established.'"

Some time since a dispute arose as to who first suggested "Balloon Signalling." I think these extracts from the leading journal will set at rest any doubt on this point, and, combined with the plan and details of my War Balloon, which ascended in the year 1854, will prove conclusive.

NOVEL AND THRILLING EXPERIENCES.

A compressed account of some rather new incidents in my life which happened during the years 1860 and 1861

will now be given, but it becomes necessary, in order to complete my narrative in the present volume, to be brief in referring to one or two eventful situations, which I do not shrink from placing before the reader, as I have no wish to dwell exclusively on the bright side of the picture.

I have been hitherto true and faithful in describing the perilous as well as the safe and successful trips which I made in rapid succession from the principal towns in England at the period to which I am drawing attention.

Besides those frequent journeys which I was accustomed to make in the Provinces, I held my own for many years at the Crystal Palace, and witnessed one or two exciting scenes at the Great Glass House, which would supply matter for a book of much larger dimensions than my present unpretentious effort. There is one occurrence which I must not leave unmentioned, as, though it forms a small part of my history, yet it may chance to divert a share of personal interest from the man to his balloons.

My store-room at the Crystal Palace was at that time a spacious portion of the north wing, and there my general equipment was kept with constant care, owing to the dryness, solidity, and supposed safety of that part of the structure.

One day a fearful gale of wind brought down a large portion of the north wing, including the square house where my property happened to be. Of course the entire lot was buried in the ruins, but an official lost no time in apprising me of the misfortune, and some sympathy was expressed as to the total loss I had sustained, owing to the certain destruction of my balloons.

On my arrival at Sydenham I gazed upon a worse looking wreck than I had expected to see; the smashed glass, twisted girders, and splintered woodwork, left small hope in my own trouble-tossed brain as to the probable condition of the traps that belonged to me; nor did the sight-seers, who had in their midst several officials and workmen, tender anything in the way of consolation. The fate of *my lot* was a foregone conclusion, so that I thought it quite as well to assume an attitude of resignation, though in reality I felt sore at heart; the crushed equipment was my sole stock-in-trade wherewith to carry out numerous engagements, some of which I must needs attend to, according to agreement, during the following week.

It was during the dinner hour, when I was left a sorrowing spectator of the scene of desolation, that I conceived the idea of making a voyage of exploration down among the *débris;* there was one opening which I entered, burrowing further and further, until I had to drop on all fours and carry my hat to save it from collapse.

Not being able to see the wicker cars, I was about to give up the search, when a whiff of wind found its way among the disjointed piles of flooring and huge masses of iron, and this brought with it that strong smell of gas which I alluded to on a former occasion, and which again showed that I was in the right track.

Nothing daunted, I struck in as far as I could crawl, and sniffed about until the scent grew stronger, and then I came upon the objects after a diligent search, but heard at the same moment a voice which I knew to be that of

Mr. Gordon, the head gardener, asking in a plaintive tone, "Whatever are you pottering about down there for Mr. C.?"

A pause now ensued, while I made a survey of sufficient accuracy to be able to know the worst, and to make a report.

"Hold on Gordon," I cried, "I am working my way out, and will tell you all about it."

On emerging with my hat considerably the worse for wear and my clothes covered with dust, I heard the words "as flat as a pancake"——

"You're wrong there; they happen to be nearly bolt upright, with a nice covering of rafters and cross planks, which mercifully spared my frail luggage, so that with extreme care we may be able to rescue the 'Queen' and 'Mars' from ignoble imprisonment, and now that I have made this welcome discovery, do come and take luncheon with me, for I feel just as hungry as a hunter, and shall be glad of your company."

The final recovery astonished everybody throughout the building, and none more so than the owner, who was, of course, most interested at the lucky escape.

REPORTED DESTRUCTION OF MY BALLOONS BY FIRE.

One of the many kinds of risk which machines of this description have to encounter, has just been described. Sometimes the trips through stormy skies are surpassed as regards danger to the thing itself, by voyages in steamboats, and travels by rail, when they are liable to be smashed by accident in going to their next place of ascent or returning to headquarters.

Then again, there are perils as to their being consumed by what is called the devouring element.

I never had much dread of losing them in this way, although I never, up to the year under consideration, attempted to insure them. Mine were too invariably out and about, up and down, to and fro, to be able to define in what precise locality they could be protected or covered by insurance.

It may naturally be supposed that this fact would, at times, cause anxiety; this was especially the case one night when a lurid glare was seen to increase over the south-west part of London, which happened to be the quarter where I was bound on urgent business as early the next morning as I could possibly reach my destination.

When I drew up my bedroom blind to its highest extent, so as to watch the distant smoke and flames as they shot up and reddened a bank of clouds, which at sundown were of a leaden aspect, I realized that a terrible fire was raging.

However, I own to not having been concerned or curious enough to stay awake all night to watch its progress, wherever it might have broken out. In the morning I should hear all particulars, and after hoping that no lives might be lost, I dozed off, and thought no more of the matter.

Feeling unusually buoyant next morning, I trotted down to the railway station and exchanged the customary salutation with the good natured chief porter, and had well nigh forgotten to ask where the conflagration was,

when the said porter, as if to put to shame my indifference, observed:

"Awful flare up that, last night, Sir."

"Indeed it was. Have you heard particulars?"

"Don't you know, Sir, Camden Town Goods' Station burnt to the ground? Every mortal scrip and scrap consumed."

"What!" I almost screamed.

"Why, you seem staggered, Mr. C. I should have thought nothing would have frightened you."

"My good man," I said, "that is just where I am going; both my balloons should be there, one from Worcester, the other from Birmingham."

"Look out, Sir, mind the train—you had rather a close shave—don't lose your nerve; I hope you'll find your balloons all safe. Good morning."

I was no sooner in the train than a jolly *vis-à-vis* passenger said: "Like to see the morning paper, Sir?"

"Thank you," I curtly replied.

"Bad fire that, last night, Sir."

"An atrocious fire!"

"Nothing personal I hope."

"My dear man," I pettishly replied, "we are both distorting the Queen's English by using strange terms. I say atrocious, you say personal. The long and short of it is, that I have lost, at least I fear so, two balloons."

"Bad job that, but, excuse me, I get out at this next station."

"Then I will say no more," but I did mutter in an undertone something to the following effect, viz, "that I

was glad to be left to my own thoughts," which had fallen (barometrically speaking) so rapidly from "set fair" to "stormy."

On reaching Camden Town, the cabman bravely conveyed me close up to the barriers which kept back the crowd; some distance inside of them, the flames and fumes were still to be seen and inhaled.

"Keep back, Sir," cried one of a posse of policemen.

I was pressing forward with all my might and main, when I caught sight of a face that I had seen before.

He, the goods' porter, seemed to guess my errand. Addressing the inspector, he said, "This gen-man is on 'tickler business."

"Yes, and on *ticklish* business too," I said. "Can you tell me anything about my balloons?"

"They were here last night, Sir," said the porter.

"My dear man, I wish they had been a hundred miles away, you mean they are burnt."

"I can only speak *gineraly* Sir, there is nothing left of any consequence."

"Consequence, man, but my traps are of the greatest consequence."

"Well Sir, if you don't mind stepping along with me into that licensed house yonder, which is, as you perceive, within these here barrers or whatsondever they are called, I will place you in 'munication with our master porter."

"Lead on then, I shall not be mean if I can hear any cheering news."

"Here Wilson, here's this ere gen'man about them hair balloons."

"Ha," cried Wilson, with an elongated visage, "bad job Sir, is'nt it?"

"Mr. Wilson, that is not the question. Are my things cinders, or are they safe?"

"I do trust that they are insured, Sir."

"They were not insured, Mr. Wilson, but if you can satisfy me by ocular demonstration that they are now in a proper position to be insured, I will give you a crown to start with."

Mr. W. shook his head ominously, "The truth is," he added, "everything is burnt, that is, 'cepting that lot of stinking fish, that was shot down on the platform last night, and our station master was that riled, that he sung out 'Wilson,' says he, 'take away, and deposit as far off as possible, these baskets.'".

"Baskets, did you say Mr. Wilson?"

"Yes, gut big uns, full of the foulest smelling lot we've had here this season. But there, you seem to have more blood in your face now, come and have a look at em, the're just behind here."

Well, to make a long story short, I followed, treading with excitement almost on Wilson's heels; but there was no fish to be seen, and I began to think that my sensitive feelings were being trifled with, when Wilson drew aside a black tarpaulin, and said, "maybe that's your lot."

Then I seized the noble fellow by the hand, and the second in command as well, keeping good faith with them, and exceeding my pledge, for had they not restored to me two old and tried friends? Fortunate and right royal

ones to me, they never, I thought, appeared in more welcome form, especially as I drew near and saluted her aërial majesty the "Queen" balloon.

STORMY TRIP FROM CONGLETON.

A first visit was made to this town under what were supposed by the inhabitants to be favourable auspices.

The weather was certainly bright and cloudless, but there blew, throughout the day, a very strong wind, so that it was doubtful whether the good air-ship "Mars," which had so luckily come out of the Crystal Palace and Camden Town disasters, would now bear the brunt of a gale which came upon us with a direct force, unbroken by trees or buildings, and which, from the first moment of the inflation, found out our open and weak points. Efforts had been made to shut off the wind with large lengths of canvas, but to little effect, as the saucy war-balloon flapped and tossed about, and the spot was too small for a public gathering, especially when the last rolling process, preparatory to starting, commenced.

To add to my troubles there was an old man present, connected probably with influential parties in the town, who *would* have his say, and was constantly loud and noisy in proclaiming his opinions, first, that the day was of the "right sort," and, secondly, that "he could tell people, who was going up."

Well, all this sort of thing would have been amusing, if anxiety had not been increased by the rough wind, for one never knows in ballooning how soon a slit may occur and put an end to all anticipations as to the ascent.

"I tell you," persistently cried the old gentleman,

"that three besides the master are going up, and a nice rattling breeze they'll have too, and what more can the balloon-man himself want—though he looks rather down about it—I suppose one may get too much of a good thing sometimes."

"My good fellow," I said, "pray close your mouth. What do you know about affairs of this kind, or how can you, of all men here assembled, be aware whether I intend to ascend alone, or take anybody with me?"

"That be blowed! If the three I mean don't go, there'll be a jolly row I can tell thee."

"Who are they, pray?"

"Well, as to that, Mister, here comes the Secretary, you'd best see to it."

"Have you," I asked, "any applications as to passengers? I hope not, as I would rather go alone a day like this."

"Ha! would you indeed, then I have done amiss in not mentioning before that three of the Pearsons of Lawton Hall, are booked."

"I regret that, as your gas in Congleton is heavy; and then you see how it blows."

"Oh, never mind that, they want to see something."

"Yes, but not to *feel* something—I mean a rough landing."

"They are quite ready for anything of that sort, and I would not have them disappointed on any account."

"*One* will have to be disappointed for certain, I can only take two besides myself, and if you had not exercised pressure as to these young gentlemen going, I should have

declined all companionship and fees to-day; in fact, I would rather have plenty of sand. I have so often found ballast to be of much greater value than cash, that I do not always consider it for the best to take passengers in boisterous weather."

"You will not, Mr. C. find it so easy to shake off these daring young fellows."

This estimate of their undoubted pluck was found to be correct; in fact, while I was on one side of the balloon, they jumped in on the other, when I was not looking; but they were politely asked to get out, and in the end only two were allowed to re-seat themselves. A rapid ascent was then made, the nearest buildings being cleared at a bound.

As it is not customary either with the captain of a ship or the master of a balloon to allude much to danger, I was discreetly reticent on that point, and engaged their attention with the fine views which surrounded us on all sides, but we moved so fast that on asking whether they knew the country on the other side of a range of hills we were approaching, they said, "Oh yes, very well, those are the Buxton Hills, we go rabbit shooting in that direction."

"Do you? Then I may take it that you are well acquainted with this neighbourhood?"

"We know every inch of the ground," was the reply.

"Altogether then," I continued, "we may look upon the valley beyond as a good place for landing."

"Decidedly so."

"Then I must ask the favour of your unshipping those seats, and of placing them just where I show you; and on nearing the earth, gentlemen, we must keep well down in

the basket, and you must hold on by these cross lines, and do not think of jumping out until I tell you. The wind is so strong that if the grapnel does not find a good hedge, bank, or tree to bring us up by, we may have some rough work, so do not feel unprepared."

"All right, never fear us, Mr. Coxwell."

"I perceive," said the elder Pearson, "that you are letting off gas, we are not going down, surely."

"Yes, I want to just clear that hill you see on the left, but I fear we draw away rather south of it; how straight your hedgerows appear."

"Oh, they are not hedgerows but stone walls," replied the younger brother.

"Dear, dear, I am sorry for that, however, we must take them now, unless we catch beforehand. Look out, I shall soon slip the grapnel; there, we get the first jerk, hold fast, the wind is stronger than I thought, and we are going down hill—by jingo, there are rocks and a fearful gorge ahead."

"We dare not get among them, Mr. Coxwell, I ought to have told you."

"Too late now, look out, we must try the holding power of those stone walls."

"They go down one after another."

"I see they do, but hold fast! the car will pass through the next."

It did, and through one or two more, but the last one slit up the balloon from bottom to top. Of course we stopped, and the rest I must permit a Buxton newspaper to relate.

THE INJURED AERONAUTS AT BUXTON.

"Mr. Coxwell, and the Messrs. Pearson, jun., of Lawton Hall, near Congleton, are now progressing, we are happy to say, towards complete recovery. It will be remembered that on August 19th a descent took place during a violent wind, on the stone-walled and rocky locality near Brierlow toll-gate, about two-and-a-half miles from Buxton.

"A valley favourable for alighting had been missed, owing to the force of the wind, and the car not being over-stocked with ballast, the voyagers found themselves skimming over the 'back-bone of England,' the wild rugged surface of which is in every way objectionable for a balloon.

"Mr. Coxwell, seeing no possible mode of evading a rough landing, prepared for the worst, and placed his passengers in the safest possible position, viz, at the bottom of either side of the basket, where hand-ropes are placed, by which to hold on in emergencies like this.

"As the grapnel (a large powerful instrument, forty-two pounds weight) trailed along the ground, it glided over the soil and tore down stone walls, as if there was no holding ground or material for it to take effect in. The consequence was that the car was brought down in contact with the walls, and the only remedy was to exhaust the gas as quickly as possible, and lessen the number of concussions. It was here manifestly that the experienced aëronaut was equal to the occasion, as he peremptorily kept his companions well down in the basket, and told them that if they attempted to move or get out, they

would be killed on the spot. Fortunately, the Messrs. Pearson are remarkably endowed with what is styled pluck, and they stuck to the ship and obeyed Mr. Coxwell's orders to the letter.

"It was now the critical moment—two or three severe bumps were inevitable, the wind blowing in angry gusts, and the car dashed through one wall of about eighteen inches in thickness, making a clear breach, and hurling the stones forward as if they had been pounded by the largest Armstrong missile at present in use. Mr. Coxwell was full strain on the upper valve, which is thirty inches in diameter, but still the mass bore onwards, and a second clean breach was repeated in the next wall.

"Away again with renewed vigour, and down for the third time, and once again through another wall, and now the cry was raised by astounded lookers-on, that two fields further lay the Deep Dale or gorge which would surely prove fatal.

"Happily, the fourth wall having been dashed down, and a considerable quantity of gas lost—the balloon itself caught some of the stones and tore from bottom to top—several countrymen, especially the sons of the toll-bar keeper, now rushed to the rescue.

"Mr. Coxwell and Messrs. T. and A. Pearson were at the bottom of the car, covered with stones. All three voyagers presented a sorry aspect, their faces were covered with blood; but the aëronaut himself retained his senses and directed that they might be taken out of the basket and placed on the grass, and furnished with water.

"This done, Mr. Coxwell enquired if there was any

house near, and finding that the toll-bar was close at hand, directions were given for them to be carried there. Mr. Coxwell then despatched a messenger for a conveyance to take them to the Royal Hotel, at Buxton, where they arrived in due time, and received the best medical attention that could be procured.

"The injuries sustained were: Mr. T. Pearson, fracture of the skull; Mr. A. Pearson, injury to the head and broken fore-arm; and Mr. Coxwell, bruised and cut from head to foot, with a bad contused wound on the right thigh. The injuries Mr. Coxwell had met with were not considered, at first, dangerous; but those sustained by the other gentlemen extremely so. Dr. Bennett of Buxton, in company with Dr. Bullock, an eminent practitioner of Congleton, took the cases in hand, and succeeded in saving the arm of Mr. A. Pearson, and in reducing the skull fracture of the brother; Mr. Coxwell's case presented symptons which showed deeper injuries than were suspected to exist, the thigh was bruised and lacerated by an immense stone, so that the medical gentlemen could scarcely comprehend how the bone escaped fracture; erysipelas set in, and the case assumed dangerous appearances, but Dr. Bennett skilfully made a long deep incision which had the desired effect, and the healing process is now rapidly progressing, and all three sufferers are doing well and leave their beds.

"This, we believe, is the first personal accident that has ever befallen Mr. Coxwell out of nearly 400 ascents, had it occurred to a novice, some outcry might be raised as to the perils of ballooning, but since this mishap we have had

two terrific railway smashes, three or four dreadful fires, and an omnibus accident near Whaley Bridge; all these considered, we can only fairly and reasonably come to the conclusion that balloons are like ships, coaches, railway trains, and other vehicles, liable to accident and subject to occasionable wreck."

A SIMILAR PERILOUS DESCENT BY MR. GREEN.

Mr. Hatton Turnor, in his excellent work, "Astra Castra," gives an account of this occurrence, which, taken in conjunction with my own, will remove a wrong, but very common impression, that aëronauts of repute and long experience never have a failure nor an accident.

It is all very well for third or fourth rate balloonists to declare themselves hard and fast in this boastful and extravagant kind of style, but it will not do for men whose careers are a matter of public property.

On the occasion of a fête at Cremorne Gardens, Chelsea, in 1841, for the benefit of the Polish Refugees, a gentleman named Macdonnell, said to be a representative of the *Times* newspaper, ascended with Mr. C. Green, and subsequently gave the following description, which will be perused with interest.

"It was about five minutes after seven when Mr. Green (with his liberator, as he calls it) finally let loose the last links that bound the balloon to the earth. We immediately ascended with a swift and steady motion till we attained the height of about 1500 feet, at which elevation we continued to move with considerable velocity, till we found ourselves over the Isle of Dogs, when, throwing out some ballast, we rose many hundred feet higher, and were borne

in a south-westerly direction towards the centre of the county of Kent.

"Here, at Mr. Green's desire, I threw out occasionally several pieces of paper, in order to ascertain whether we were rising or remaining at a stationary height.

"Soon afterwards, Mr. Green drew my attention to the smoke of the many steamers which were passing, and which was evidently blown towards the County of Essex. Accordingly he thought we might descend in the salt marshes, where there were no woods or orchards to obstruct our progress. Mr. Green made his preparations, let out gas, and we passed over the Thames. He then cautioned me particularly to take fast hold of a rope, which he had fastened across the wicker car, and luckily I obeyed his instructions to the letter, for presently we felt a slight check from the grappling-iron, let down from the hoop to the distance of 140 feet towards the earth.

"A moment after, there came a terrific shock; we were going at the rate of sixty miles an hour, and our anchor caught in the side of a dyke, and, owing to the extreme speed at which we were travelling, tore its way through the hoop to which it was fastened, and, coming in contact with the car as it snapped, completely upset it, so that we were turned topsy-turvey, with our heads towards the ground, the rope which was passed across the car alone preventing our falling out; though so complete was the upset, that most of the contents of the car, such as the ballast, &c., as well as my own hat, dropped to the earth.

"In another moment the car righted, and the balloon, thus freed from every check, descended, dashing us with

terrific force against the ground. Immediately afterwards it re-ascended, and again brought us with a fearful collision to the earth. We were then carried along for half a mile until we reached a creek or small river, through which we hurried, half buried in its waters, to the opposite bank, over which we bounded like a tennis-ball, and, after a few moments, found ourselves dragged through some acres of marsh and oziers, towards a high mound; but onwards, still onwards, the terrible demon held its way.

"Ere long, we were stopped against a strong paling, but nothing could withstand our impetuosity, and we burst through the oaken timbers as if they were cobwebs.

"Mr. Green is, I am afraid, hurt internally."

ANOTHER ACCOUNT BY MR. GREEN HIMSELF.

"Our descent took place at twenty minutes past seven p.m., in a large marsh in the parish of Rainham, in Essex, after crossing the Thames four times.

"On no former occasion have I ever had to contend with so violent a wind as raged now. Notwithstanding that the spot selected was very well adapted to effect a descent, being extensive, open, marsh land, I never experienced so rough a landing. The first time the grapnel took a firm hold, the shock was so violent, that the hoop to which it was attached, and which had been used by me, and my son, in no less than 313 voyages, broke, depriving us of the grapnel and cable, both of which had been left behind, firmly fixed in the object to which the grapnel had caught, a bank. We were then dragged a mile-and-a-half in the space of three minutes, by which time nearly the whole of the gas was expended, in consequence of our never

abandoning the care of the valve-line. We received several severe shocks and concussions in passing over dykes, banks, and fences, and a strong paling, through which the car tore its way by the velocity of its motion.

"This illustrates, in a new form, that fact in natural philosophy, that a comparatively soft body, like our flexible wicker-car, when in very rapid motion, will force its way through a hard substance without itself suffering material injury. We did, indeed, get some hard knocks, but I understand that one of the reports in circulation is, that the injuries I have received are of such a nature that I must abandon the profession of an aëronaut. Permit me to say that I hope to disprove this report, by making an aerial voyage from the New World to the Old, taking advantage of the prevalence of the westerly winds, as soon as I shall have constructed the kind of balloon which I know to be necessary for that purpose."

I GET HOMEWARD ON CRUTCHES.

After a sojourn of six weeks at Buxton in the height of the season, but cut off from the customary enjoyments by being confined to my bed, I managed to get up and move about my hotel with the aid of crutches. The Pearsons had gone back to Lawton Hall, and were doing fairly well, which made me long to follow their example, and get beneath my own roof, especially as chilly October weather had set in, and I felt that under existing circumstances there is no place like home.

If I could only get as far as Derby, and rest there for a day or too, I should be among friends, and as Mr. John Allan, who accompanied me in the long voyage

to Tavistock, had been down to see me, while our mutual friend, Mr. Henry Youens, had made an ascent or two for me in the North, I thought it quite as well to ride by coach part of the way, and press on towards London by rail. The thought, however, of my returning to the domestic haven was somewhat galling, as it was the first personal injury I had sustained in this kind of life, and I scarcely knew how I should be received by my better half, who never liked ballooning and had persuaded me to follow, as much as possible, my profession as a surgeon-dentist, so as to be in a position to relinquish the more flighty pursuit in case I got tired of it.

But I was not tired of it, and how could I venture back and sail under false colours?

No matter, it was just possible, as Mr. Allan had observed, a few moments before we were put down from a cab, that no questions or allusions would be made, as to my future intentions.

Nor were they for some time, and, at last, I began to wonder why the good wife was so pleased and amiable, as she had often vowed that if I was brought home with a broken leg or arm, she was'nt quite sure that I should be nursed as tenderly as if I had a natural illness; since it appeared to her, that so very much ballooning, in all kinds of places and weather, was like tempting Providence, and she had more than once made a resolute stand against the further indulgence of my fascinating pursuit.

Why, then, was my better half so composed after the first cheering greeting had welcomed me back?

It all came out one morning after the local doctor had been to attend to my wound, which had not fully healed when I left Buxton.

I knew there was something in reserve, and had commenced light fencing with a view to eliciting the truth, and this is what happened.

"I have it, Henry, on the authority of more than one medical man, that you will never again go up in a balloon, and, I regret to add, that you will be permanently lame."

"Shall I indeed! And *what else* do they prophesy? That I shall *never ascend* again, eh? Well, we will talk that matter over next spring. In the mean time, when I can lay aside these wooden legs, I must finish that small silk balloon I bought, which belonged to Green; if we throw in a new top, it can be made as good as ever it was."

"Mr. Coxwell! How can you be so provoking."

"Well," I replied, "my hands are uninjured; work I must, or I shall soon have the natural illness of which you spoke."

"If, Mr. Coxwell, you will only look in your dental work room, you will there find something awaiting your attention of a much more acceptable character than the reforming of a silk balloon."

"I will not neglect business, rest assured, but as to these deplorable predictions, do not believe in them, and recollect that no bones were broken; as to flesh wounds, damaged tendons, and strained muscles, it is beyond the ken of all the doctors I have been in consultation with, to know what new formations, and what recuperative

efforts may be actually at work before this day six months, and to show the doctor how I disagree with his abominable prognostics, I will throw aside my left hand crutch the next time he comes, and will pull myself together with an extra struggle, and if I can only show one of the faculty, how little they know, it will be doing a kind and useful act, against which even my own wife will not, I am sure, set her face."

I had now the happiness of perceiving that I had here touched a chord, which vibrated to a greater extent than I had intended.

The bare idea of my not being permanently lame! How clever I should be to disprove that.

Time, the great wonder worker, now began to work favourable changes, even ere the Christmas of 1861 had passed, I began to show signs of being able to walk alone. The crutches were smashed, I was deprived of two sticks, and had to stand or fall, as best I could, without them.

I was enabled to go about the garden, and to slyly pull about that *confounded* balloon I alluded to, and to secretly design a new crown to it.

Friends and acquaintances, who knew very well in what respects my wife and I differed in tastes, would not infrequently, for the sake of pacification and good intention, "hold with the hare and hunt with the hounds."

Sometimes, when my hobby was being distantly referred to, I was detected in the act of winking and blinking, as much as to say, "I will though, if ever I get near a balloon." All of which was understood to mean, that what had been uttered about my never again going up,

must not be taken as meant literally, at least, so far as I was concerned.

One day a lady visitor called, and in the course of general conversation, exclaimed, "what an odd and remarkable couple you are. Your wife dislikes ballooning, and yet everybody can see how zealously she helps you, and, indeed, she is your right hand when you are constructing these balloons. I wonder that you never took her up."

"She ascended once to save me from reproach."

"Did she, indeed, I never heard of that before; where, pray, might that have taken place?"

"It was from Berlin during revolutionary times, when a large gathering was apprehended in the streets, as I was about to show how the city could be bombarded by a balloon.

"At the eleventh hour this exhibition was prohibited, and an old friend of mine, who at that time resided in the Prussian capital, suggested that, as the chief attraction could not take place, some counter novelty might be announced, he proposed that Madame Coxwell's name might be inserted in the evening paper, and though I declined to accede to this, stating that my wife would not go on any account, still the idea crept into the papers, and there was I, in a nice mess, not knowing how to break it to her, nor how I should stand with the public when a decided hoax transpired.

"My friend managed the matter very cleverly, however, so that when my wife was on the grounds next day, he asked at an early hour, how it was that everybody was looking admiringly at Mrs. C., and that everyone was

expecting that she was going up. Then he had further to explain himself, and let the cat out of the bag by putting it thus—

"'If you do not accompany your husband for once in your life, it will lead to a great disappointment, and you will compromise Coxwell's good name.'

"That appeal did it; my wife, as a matter of duty, ascended with two Prussian officers and myself, but she never aspired to go again, and I always studiously declined to ask her, being ever grateful for that one crowning act, in which she renounced self, and studied my reputation, at the risk of her own life."

CHAPTER V.

RENCONTRE WITH MY MEDICAL ATTENDANT.

THE steady but sure action of a long spell of repose began to manifest itself, as the fine breezy days of March came round in the spring of 1862.

I had not seen my attendant, Dr. Hall, for some time, but dropped upon him unexpectedly one morning at the corner of Love Lane, Tottenham, just as he was coming out of the house of a patient.

"Hallo! old friend, whither away? What, running too?"

"Can't stop, Doctor, here's the omnibus coming, must be in town early."

"Where are your sticks? Have a care for that poor leg."

"All right. Hi! Omnibus, stop!"

As I trotted forward, I could hear the Doctor exclaiming, "Bless the man, what a change."

And so there was; I was pretty well myself again, and as to the permanent lameness, it was all moonshine. Anyhow I found myself in pretty active motion, and was going to meet a gentleman, who had telegraphed his errand as "urgent," relative to Scientific Ballooning.

This had a magic effect on a sensitive nature, and a perusal of the newspaper on my way up to London, explained, to some extent, why I was wanted.

There had been a great meeting of the Committee of the British Association at Wolverhampton, and they had been experimenting with a Cremorne balloon, in order to take Meteorological Observations at a great elevation *if possible*, but the balloon, which was piloted by a practical aëronaut, viz. Mr. Thomas Lythgoe, did not attain the desired altitude, so that Mr. Creswick, of the Royal Observatory, Greenwich, who was commissioned to observe the instruments, was doomed to disappointment, as was Mr. Lythgoe the balloonist; the machine was faulty from frequent usage, and now that it was being employed for objects of great interest, refused to ascend very high, and came down not far from the place of starting, from "sheer inanition," as the newspapers described it.

"So, so," I think I can guess what the nature of their proposition will be; but how about my own balloons?"

This led to reflection, which produced a depressing effect, as I had not been able to get over to the Crystal Palace so often as I was in the habit of doing before my accident, and the largest of my balloons was not in a state for such service, as I guessed was now required.

"Never mind," said Mr. Lythgoe, when he arrived and went into the recent attempt, "you must go back with me and take your largest balloon; you are so well known in Wolverhampton that the cry is all round for you '*to put in an appearance.*' We must have your balloon 'Mars' and lose no time in getting it there."

I did so, and arrived next day with bag and baggage, such as it was; but I explained most frankly that before I could undertake to do anything I must be thoroughly

informed of the objects and intentions of the Committee, as I could not consent to move in the matter unless I felt sure that I could carry out their wishes.

A formal meeting was then held, the active and more prominent members of which were Colonel Sykes, M.P., Dr. Lee, and Mr. James Glaisher, F.R.S.

When we came to figures and facts, I was utterly astonished; not that I was in any way proficient myself in arithmetic and mathematics, but I could see at a glance that these learned men had not entered upon their proposed explorations in the upper air, with such calculations as the great pillars of science might have been expected to make in connection with researches of deep interest to the learned world. Of course, profound knowledge and ability to do so were all there, but, singular to relate, the powers had not been exercised, or these learned professors might have known by ten minutes figuring that the balloon, which was imperatively needed to carry out their ascents up to five miles high, must necessarily be of much greater dimensions than they had expected. Indeed, after going into a few plain, practical preliminaries, which spoke volumes, as one of the *savants* confessed, it was found that they were wrong altogether, and that I could not, according to my own admission, benefit them very much with the balloon I had brought down. This required, as I clearly stated, mending, and was not large enough; so I said that I would rather withdraw, if they relied upon my attaining the required elevation, as I could prove to them that we could not get more than, if so much as, three miles high.

"Then what are we to do, Mr. Coxwell, do give us your candid advice."

"Build a brand new balloon, fitted by internal capacity and general construction for the requirements of the British Association."

"We cannot, there are no funds for that purpose, the grant for trial ascents is all that we can touch."

"If that is your position, Gentlemen, I will myself aid the cause in a way that may help you."

"How is that, pray?"

"I will undertake, at my own cost, to construct the required balloon, and will be ready by Midsummer Day to make such an ascent that will bring no discredit upon any one connected with the affair."

"A very liberal and encouraging offer," was the reply, "and one that will place the aëronaut in a more commanding position than he would otherwise have had among scientific men and the British public."

This proposition having been readily accepted and industriously proclaimed by local newsmongers, I hastened back to give orders for the materials wherewith to construct a very large balloon.

But how was I to break this startling and unlooked-for intelligence at home? How was I to comport myself and explain those fresh enterprises with which I had identified my name, and which might obtain publicity before I could tell my own little story with extenuating explanations?

I had every reason to suppose that an anxious wife would pronounce me a more incorrigible *balloonatic* than ever, nor was I quite certain that the family doctor would

not be called in again to examine my head and nervous system, as a rash and sudden act of this sort, characterised too by almost unhealthy-looking generosity with one's cash, would probably not commend itself to the clear and instantaneous perceptions of my wife.

Luckily for me, before I told my own tale, there had been a meeting at our house relative to an article in the morning newspapers, which gave an outline of what had been agreed upon at Wolverhampton.

My wife was strongly advised not in any way to throw a wet blanket on what had been decided upon, or the results to a person of my temperament might prove unfortunate.

"Recollect," said an old friend, "that Coxwell has always aimed at turning ballooning to a useful account for military and meteorological purposes, if his ardour is damped now that he has recovered from his misfortune, it will not do him much good, better far to humour his caprice, as he has pledged himself to the British Association, and if I gauge him aright, he will not go far wrong, nor bring any reproach upon his profession."

When once the position was discussed with a fair amount of common-sense and worldly wisdom, all difficulties and drawbacks vanished, a strong right arm was therefore forthcoming the moment I was ready for the stitching and such like work.

All the available sempstresses of our neighbourhood were duly interviewed, tried old hands were taken on at once, and the net maker, the basket maker, and the valve maker were invited down to take orders, the execution of which would brook no delay.

A large schoolroom with a clear flooring was engaged for pattern forming, and the oiling of the fabric to be used which was a kind of American cloth, made to order, and suitable for my requirements.

There would be no time to build such a stupendous machine of choice silk, as the preparation and manufacture of so expensive a substance would occupy six months, to say nothing of an expenditure of at least £2000 which would be necessary.

I was pleased to hear, some time after the meeting at Wolverhampton, that a determination had been arrived at that Mr. Glaisher himself was to go up.

The fresh impetus given to the subject, and, I may add, the fresh halo shed around the gigantic new balloon, and the performances which it was expected to achieve, had a remarkable influence on Mr. Glaisher; although that gentleman had never yet ascended, still he had become, possibly by hearing my experiences recounted, a decided optimist disciple, and he wrote to me stating that he intended to take the observations himself.

This afforded me an additional motive for anticipating success. I knew very well Mr. Glaisher's position at the Royal Observatory, how zealous he had been in the advancement of Meteorological Science, and what a firm and persevering mind he had, when once it was directed to the investigation of any subject he took up, and, although explorations in the air were quite new to him, as he did not at that time seem to know much about aërostation *per se*, still he was anxious to gather all the information he could, and I found that it was no slight study that he

devoted to the subject long before we were able to launch the balloon; he came down occasionally to see and report progress, and we had the privilege one afternoon, of visiting, in company with Dr. Lee, of Hartwell House, my neighbour, Luke Howard, the father of meteorology, whose original works and instructive observations I possessed; the scientist, Luke Howard, was then a nonagenarian, but his son, Robert, also a scientific man, descanted on his father's remarkable weather-wisdom, while the veteran rested on a sofa, as one who was feebly listening to the life story of another, and not to his own, if one could judge by his manner and modesty.

Besides the long school room, in which hundreds of yards of oiled cloth hung suspended, we had two or three temporary tents in our garden; here a certain portion of the work was done under the watchful eye of my better half, who was invariably the first astir, and always before sunrise, so that as the months of May and June came round, the smoke might be seen issuing from our chimneys long before the earliest labourer went forth to his daily toil.

One day, Dr. Hall came into the garden, looking approvingly at our soiled hands, and pronounced almost a benediction on the visible indications of labour.

"That's the kind of thing to cure most ailments," he cried, "you have no need to be ashamed. Nobody ever cut much of a figure in the world without hard work. But," he asked, "what is that nice odour arising under the fruit trees?"

The fact is, that certain pieces of crockery ware had been popped out of sight by some of the young work women, who knew what a searching eye the Doctor had, and did not care to expose unfashionable modes of living at an exceptionally busy period of our history, when every moment was an object.

My wife, who did not encourage this attempt at deception, boldly declared that we were just about to have dinner.

"Dinner," exclaimed the Doctor, "you mean breakfast, it is only eleven o'clock."

"I mean what I say, Doctor, that is dinner. Remember that we have our coffee at 4 A.M., and we are now quite ready for a substantial meal, and if you will join us, do so."

"Good morning," cried the Doctor, "I envy you your appetite, and confess that there is no tonic in my dispensary that is equal to early rising and active exercise for mind and body."

Another little anecdote about the Doctor may serve to illustrate the kind of life we were pursuing while preparing for a new departure in aërial travelling.

We were getting, to confess the truth, rather overworked, I had been sunning a section of the new balloon on a spacious plot of grass, and had remained in the open air after the dew began to rise, before folding up the newly varnished cloth, when I fancied that I had taken a chill through being overheated.

Before I went indoors, however, the bell rang, and I opened the outer gate myself, when Dr. Hall presented himself, and on seeing me, he threw up his hands, saying, "Very wrong, Coxwell! You ought to be in bed."

"Why so?" I asked.

"Why so! you have got the cholera."

"The dickens I have. Here, Mrs. C.," I cried, "I have contracted cholera."

"Get away in," said the Doctor, "I have something in my bag for you to take at once;" and there was I, ready in my bewilderment, to swallow any mortal drug or creature comfort.

The good wife, however, was not willing that I should do so. She said, "There must be some mistake here, Doctor, unless *I* am very much mistaken."

"No, you sent up not long ago, to say that Coxwell was taken with cholera."

"Not I, it is a mistake altogether."

At that moment, the doctor's assistant came in to say, that it was old Coxel, the farmer, who was taken, and the poor man lived not far from us, but the messenger had pronounced his name so much like mine, that the blunder was excusable.

The shock, however, was not so readily surmounted, for some little time I felt as if I really had something of the kind.

The Doctor, who was not a man to stand much on ceremony, hastened off to Farmer Coxel, but he looked in on his way back, and asked what simple domestic remedy I had resorted to, and when I told him that I had taken a glass of brandy and water, he said, "Have another, and I will join you. Under the present circumstances, you could not have taken a more prudent step."

THE GREAT BALLOON COMPLETED AT TOTTENHAM.

On the third week in June, 1862, I was enabled to te through the medium of a local newspaper, that I s perfectly ready for the experiments in which the itish Association was about to engage, consisting of a ries of observations in the upper regions with a view determining the laws of storms and other atmospheric riations, by instruments of the most accurate and licate construction.

The failure with the balloon from Cremorne induced the ommittee to seek my services, it was stated, and the alloon was now completed, having been constructed in he immediate vicinity of my own residence.

It's dimensions, when fully inflated, were: height ighty feet from the ground, diameter over fifty-five feet, nd it was capable of containing, if fully inflated, over 3,000 cubic feet of gas.

It had just been inspected by Colonel Sykes, Lord Wrottesley, Mr. Glaisher, and a party of gentlemen, who expressed their admiration of, and satisfaction with, the way in which I had accomplished the work of so huge a balloon which was to forthwith proceed to Wolverhampton in order to make a first ascent.

THE INTENDED METEOROLOGICAL EXPERIMENTS.

"The Balloon Committee," said a morning newspaper, "are now in Wolverhampton, to repeat the experiments before attempted in this town with a view to determining the temperature and humidity of the air at different heights, the time of vibration of a magnet, and to take observations on electricity.

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"The balloon was to have ascended from the groun attached to the works of the Wolverhampton G Company. Here Mr. Glaisher, to whom the making the observations was entrusted, had ready all the ve delicately constructed barometers, thermometers, vess for trapping the air, Professor Thomson's electrome (lent for the occasion) and other valuable but equa fragile instruments.

"The falling of a considerable quantity of ra accompanied with a rather high wind, rendered impossible to ascend during the forenoon. The weath however, began to clear up about mid-day, and it w resolved that an afternoon ascent should be made, l the balloon being perfectly new, the unfolding a spreading of it, through the adhesive nature of t varnish, was the work of some time.

"It was then found that the day had too far advanc and it was, perhaps, a happy circumstance that this w so, for on account of the strong wind that was th blowing, the getting clear of the earth would have be attended with great risk to the safety of the instrumen upon the perfect condition of which, the value of t experiments would depend. Under these circumstan it was determined to postpone the ascent until Mond morning.

"On the 30th of June the weather prevented an asce but on July 17th the work of inflating the mammo machine commenced at about half-past five in t morning, and ceased at nine, by which hour 66,000 cu feet of gas had been thrown in.

"Lord Wrottesley and the Hon. Arthur Wrottesley were at this time upon the ground, in addition to Mr. Glaisher and Dr. Lee. A large number of the inhabitants of the town were also present.

"By half-past nine the car had been attached, and Mr. Glaisher having taken his seat with Mr. Coxwell, the vast machine was liberated and ascended majestically in an E.N.E. direction. At 9.56 it sailed beyond the reach of observation even with a telescope.

"The voyagers wished to descend twice, before making a final landing. By this means Mr. Glaisher would be able to make experiments as a check on each separate series. The direction in which the wind blew rendered the execution of this intention more than difficult, as they might be on the coast before it could be executed.

A telegram received from Mr. Glaisher showed that the balloon descended at Langham, near Oakham, at about noon, after an altitude of five miles had been reached. At the highest point the temperature was 16°, the air very dry, and the electricity positive.

"The distance travelled in two hours was about sixty miles.

"Had Mr. Coxwell remained above the clouds another hour, Mr. Glaisher would have found himself in the neck of the Wash.

"The way in which so lofty a course was executed in so short a time, elicited general approval after the Committee had been apprised of the details."

MR. GLAISHER'S REPORT.

Published by request of the Committee, which consist of:—

Colonel SYKES.
Professor AIRY.
Sir D. BREWSTER.
Admiral FITZROY.
Mr. FAIRBAIRN.
Lord WROTTESLEY.
Sir J. HERSCHEL.
Dr. LLOYD.
Dr. LEE.
Dr. W. A. MILLER.
Dr. ROBINSON.
Mr. GASSIOT.
Mr. GLAISHER.
Dr. TYNDALL.

OBJECTS OF THE EXPERIMENTS.

The *primary* objects were:—The determination of t temperature of the air, and its hygrometrical states, different elevations, *as high as possible*.

The secondary objects were:—

To determine the temperature of the dew-point Daniell's dew-point hygrometer, by Regnault's condensi hygrometer, and by dry and wet bulb thermometers ordinarily used, as well as when under the influence of t aspirator; so that considerable volumes of air were ma to pass over both their bulbs, at different elevations, *high as possible*, but particularly up to those heights whe man may be resident, or where troops may be located, in the high lands and plains of India, with the view ascertaining what confidence may be placed in the use the dry and wet bulb thermometers at those elevations, comparison with the results as found from them, and wit

those found directly by Daniell's and Regnault's hygrometers, and to compare the results as found from the two hygrometers together.

To compare the readings of an aneroid barometer with those of a mercurial barometer up to five miles.

To determine the electrical state of the air.

To determine the oxygenic condition of the atmosphere by means of ozone papers.

To determine the time of vibration of a magnet on the earth, and at different distances from it.

To collect air at different elevations.

To note the height and kind of clouds, their density and thickness.

To determine, if possible, the rate and direction of different currents in the atmosphere.

To make observations on sound.

To note atmospherical phenomena in general, and to make general observations.

INSTRUMENTS AND APPARATUS.

The instruments used were mercurial and aneroid barometers, dry and wet bulb thermometers, Daniell's dew-point hygrometer, Regnault's condensing hygrometer, maximum and minimum thermometers, a magnet for horizontal vibration, hermetically sealed glass tubes, from which air had been exhausted, ozone papers, and an electrometer lent by Prof. W. Thomson, of Glasgow.

Barometers.—The mercurial barometer employed in all the ascents—a Gay-Lussac's syphon barometer by Mr. P. Aidie—was one of those used by Mr. Welsh in the year 1852, in his experiments. The inner diameter of its tube

is 0.25 inch. The graduations were made on a brass scale, from its middle point upwards and downwards, each division was about 0.05 inch in length, representing twice that value, so that an observation of either the lower or upper surface of the mercury would give the approximate length of the column of mercury.

The barometer was furnished with its own thermometer, the bulb of the latter being immersed in a tube of mercury of the same diameter as that of the barometer.

This instrument sometimes read more than 20° in excess of that of the sensitive air-thermometer.

The aneroid barometers were made by Messrs. Negretti and Zambra; one was graduated to thirteen inches and the other to five inches, the latter instrument having been used in later ascents.

DRY AND WET-BULB THERMOMETERS.

Two pairs of these were employed, one being protected by a double highly-polished silver shade, in the form of a frustrum of a cone, open at top and bottom. A cistern was fixed near to them, from which water was conveyed to the wet-bulb thermometer.

The bulbs of the second pair of dry and wet bulb thermometers were enclosed in two silver tubes placed side by side, and connected together by a cross tube joining their upper ends, and over both were placed double shades as in the other pair of thermometers. In the left-hand tube was placed the dry-bulb, and in the right-hand tube the wet-bulb thermometer. Towards the lower end of the left-hand tube there was an opening; by means of the aspirator, a current of air was drawn in

at this aperture, then passed the dry-bulb in its upward passage into the small horizontal tube, and thence into the right-hand tube, passing downwards over the wet-bulb, and away by a flexible tube into the aspirator. These instruments were made by Messrs. Negretti & Zambra.

REGNAULT'S CONDENSING HYGROMETER.

This instrument by the same makers, was constructed with two thermometers, as described by Regnault in the *Annuaire Météorologique de la France*, for 1849, excepting that it was furnished with silver-gilt cups. The scale was of ivory, and the two thermometers were fixed in their cups by means of cork, for ready packing up.

Daniell's Hygrometer was of the usual construction.

Exhausted Tubes for collecting air. These were partly constructed by Mr. Casella.

The Thermometers were exceedingly sensitive. The bulbs were long and cylindrical, being about three-fourths of an inch in length, one-twelfth of an inch in diameter. The graduations, extended to minus 40°, were all on ivory scales.

These thermometers on being removed from a room heated 20° above that of an adjoining apartment, acquired the temperature within half a degree in about ten or twelve seconds; but in passing from a heated apartment to one of lower temperature, it took more than double the time to approximate to within half a degree of the latter.

MR. GLAISHER'S REPORT OF THE FIRST ASCENT.

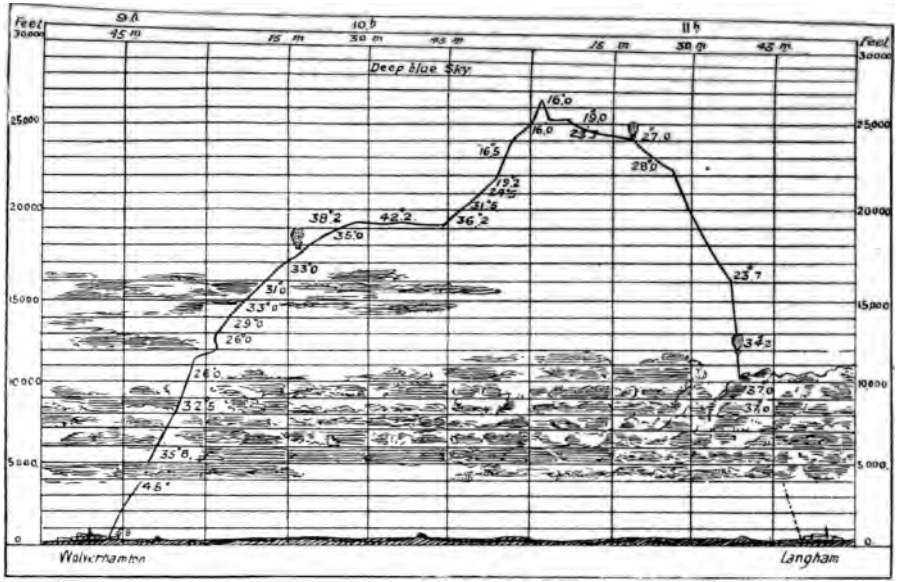
"One end of the car was occupied by Mr. Coxwell; near the other, in front of myself, was placed a board or table,

the extremities of which rested on the sides of the car; upon this board were placed suitable framework to carry the several thermometers, hygrometers, magnet, aneroid barometer, &c., a perforation through it admitted the lower branch of the mercurial barometer to descend below, leaving the upper branch at a convenient height for observing. A watch was set to Greenwich time, and placed directly opposite to myself. The central space of the table was occupied by my note-book. The aspirator was fixed underneath the centre of the board, so as to be conveniently workable by either my feet or hands. Holes were cut in the board to admit the passage of the flexible tubes, one of which passed to Regnault's hygrometer, and the other to the place of the dry-and-wet-bulb thermometers previously referred to, both the tubes being furnished with stop-cocks.

"The Balloon was inflated at the Stafford Road Gas Works, with carburetted gas, most carefully prepared by the Engineer, Mr. Thomas Proud, and frequently kept a long time for our use, the Directors of the Gas Company having most liberally, to their great inconvenience, placed a gasometer at our disposal for as long a time as we needed it.

"The weather previously had been bad for a long time, and the ascent had in consequence been delayed some days, the wind was still blowing strong from the west, and considerable difficulty was experienced in the preliminary arrangements, and no instrument was placed in its position before starting.

"The ascent took place at 9h. 43m. a.m., and at once



FIRST ASCENT FROM WOLVERHAMPTON. PATH OF THE BALLOON. [*To face p.* 106.

the balloon was quiescent. A height of 3,800 feet was reached before an observation could be taken; at 4,000 feet clouds were entered, which were left at 8,000 feet. The temperature of the air fell to 33°, and a height exceeding 10,000 feet had been passed before all the instruments were in working order. The sky was then noticed to be of a deep blue colour, without a cloud of any kind upon its surface.

"At starting, the temperature of the air was 59°, and dew-point 55°; at 4,000 feet it was 45°, dew-point 33°, and descended to 26° at 10,000 feet, dew-point 19°, and then there was no variation of temperature between this height and 13,000 feet. During the time of passing through this space, both Mr. Coxwell and myself put on additional clothing, feeling certain that we should experience a temperature below zero before we reached five miles high, but to my surprise, at the height of 15,500 feet, temperature, as shown by all the sensitive instruments, was 31°, dew-point 25°, and at each successive reading up to 19, 500 feet, the temperature increased, and was here at 42°, dew-point 24°. We had both thrown off all extra clothing.

"Within two minutes after this time, when we had fallen somewhat, the temperature began to decrease with extraordinary rapidity, and was 16°, or 27° less than it was 26 minutes before: at this time a height of five miles had been reached at about 11 a.m.

"When the balloon had attained a height of four miles, I wished to descend for one or two miles, and then to re-ascend, but Mr. Coxwell, who had been watching i

progress with reference to the clouds below, felt certain that we were too near the Wash; prudence, therefore, caused us to abandon the attempt.

"Mr. Coxwell had reserved a large amount of ballast, which he discharged as quickly as possible to check the rapidity of the descent, as we came down fast, passing from a height of 16,300 feet, to one of 12,400 feet, between 11h. 38m., and 11h. 39m., dipping then into a dense cloud at this elevation, which proved to be no less than 8,000 feet in thickness, and, whilst passing through this, the balloon was invisible from the car.

"Notwithstanding all his exertions we collected weight by the condensation of that immense amount of vapour through which we had passed, the descent was necessarily very rapid, and we came to the earth with a considerable shock, which broke nearly all the instruments.

"The descent took place at Langham, near Oakham, in Rutlandshire, in a meadow near the residence of Mr. E. G. Baker, from whom we received the utmost attention."

MY OWN VERSION OF OUR FIRST HIGH ASCENT.

Happily I have "nothing to extenuate," but still, something supplementary to offer—for the first time by the way—as to my own impressions of this primary essay in purely scientific ballooning. Of course I shall do so in my own way, and shall not affect the scientific treatment accorded by Mr. Glaisher. It will be seen, or may now be inferred by the reader, that, in an undertaking of this kind, two different kinds of men are required—the observer, who is intent and devoted to his instruments and the pilot, who in new fields of aërial exploration

must, to be successful, have studied and grasped the requirements of the Association and of the Meteorologist, so as to be able to place the said observer in the most favourable positions as to height, quick or slow movement in a vertical or horizontal direction, and above all, to ensure safety, if possible, in such changeful and precarious work, so that the balloon, the instruments, and—far more than either—the life of the Meteorologist, should be considered and preserved.

The practical department being so all essential, it is matter for wonder that we find in the annals of aëronautics that scientific men sometimes, instead of seeking the aid of *scientific aëronauts*, have undertaken these double duties themselves, the natural result being, that bewilderment and inattention, ending of course in failure and accident, have more than once flowed from an attempt to do great things in two different branches of science which are totally distinct, and a knowledge of which is seldom found in one and the same person, however aspiring and varied may be his mental powers.

It was well, perhaps, for the honour of the British Association, that the importance of a proper division of labour had been accepted, though not thought of at first, when the small Cremorne balloon was engaged to do giant's work, and also when my small balloon was sent for, as if these comparatively diminutive machines could do what they were to all appearances expected to do. That simple yet all important part of the business had been, I fear, overlooked by the Committee, but no sooner had Mr. Glaisher's attention been called to this omission,

than he proceeded to make his own calculations, which bore out the roughly formed estimate which I had made myself, when I undertook to provide a suitable balloon for a five mile ascent.

The antecedent high ascents which had been so ably made by Mr. Welsh in the year 1852, under the management of Mr. C. Green, were conducted in the far-famed "Nassau Balloon."

It was supposed that, owing to age and its behaviour at a previous trial, Green's balloon was unequal to fresh duties in which the temperature of the air would undergo rapid variations and attain to excessive cold. All these drawbacks led up to the acceptance of my offer, and I was pleased to find that the trial trip with Mr. Glaisher from Wolverhampton, bore out the opinions I had formed of an expeditiously designed piece of workmanship, and although I did not consider or pronounce it to be, at the outset, so perfect as it could afterwards be made by further varnishing, still, the stipulated height had been attained, and had it not been for the abnormal condition of that elevation where the clouds had accumulated, and the irregular reduction of temperature which was met with, the probability is that a more gradual descent would have been made, and that no instruments would have been broken. A new balloon, however strange it may appear, is seldom so tight in its holding properties as the fabric becomes after it has been distended and used somewhat, then, indeed, another dressing tends to fill up all disturbed specks and pores which may have developed themselves by coming to the surface, and which may have remained

unseen to the naked eye until the superficial skin of oil is rubbed off.

This apprehension induced me to re-varnish my balloon before again using it, and we found that the next descent and the amount of ballast expended seemed to bear out our expectations; at the same time, the conditions of the atmosphere on the second occasion were not, as will be seen by Mr. Glaisher's second report, at all similar to the meteorological state of the air on July 17th.

I have frequently in lectures (which have not, however, appeared in book form) expressed my astonishment and admiration of the personal bearing of Mr. Glaisher in the balloon car, when he undertook, without previous schooling and initiation, to go up to an altitude of five miles. I had never myself been to that elevation, but had been, when alone in Germany, as high as I could get with a balloon of 34,000 feet capacity; but this calm and self-possessed start on the part of Mr. Glaisher satisfied me as to his having the requisite qualifications for the duties upon which he had entered. I thought, too, that he even seemed to take a delight in the mode of travelling itself, and of the sight-seeing, scenery, and cloud-scapes, which from time to time presented themselves, irrespective of the philosophical uses to which his notes and deductions were to be turned subsequently, when they were studied and gone into in his own systematic way. This to me was particularly gratifying, as I had read and heard of attempts by scientific men years previously, who had trembled in the car, and could

not do justice to their own powers and abilities for want of nerve.

Perhaps the previous interchange of views I had enjoyed with Mr. Glaisher, and the accounts I had given him of my more interesting trips, had a stimulating and inspiring effect; then, I may add, that he had been staying for some time in Wolverhampton, where I had frequently ascended, and never had a mishap, and where I also had many old friends who had perhaps spoken of me in favourable terms, as accustomed to high ascents.

Mr. Proud, the engineer of the Gas Works, had often seen and filled my balloon, and no doubt the same gentleman might have recounted how I had spoken to him as to my sentiments and plans in connection with these scientific ascents, and how anxious I was to be provided with the lightest possible gas, and how fully I had made up my mind to eventually surpass all previous flights to high altitudes, by such a culminating exploration, as would sorely test our lungs and our hearts, but which I fully intended should leave a mark which could not easily be surpassed, and which would furnish the British Association with records with which they would not be displeased.

Whether Mr. Glaisher had heard of the hatching of this wicked plot, I cannot say, but he seemed after he had once tasted of the perils and delights of ballooning, to tacitly approve of the sketchy outline which he did not denounce and for which he positively appeared to entertain a relish.

When we came down with a sharp thump, after emerging from that deep and dense cloud of 8,000 feet in thickness, I remember thinking that "this will be his first

and last attempt." I offered some explanation of the unexpected sharp contact with the earth, but Mr. Glaisher seemed to think very little of personal discomfort, it was his instruments about which he was anxious, as he would not be ready for the next ascent quite so soon as he could wish, owing to the fact that replacement would take some little time, unless the opticians were ready with duplicates.

CHAPTER VI.

IT was quite encouraging to find that Mr. Glaisher was neither particularly surprised nor disheartened by the rough landing; this, to me, was a promising augury, so that no very great length of time elapsed before I informed Mr. Glaisher of a proposed ascent from the Crystal Palace, when, if he thought some observations at a lower elevation would be worth having, I should be glad if he would take his seat, and obtain as much information as he possibly could during my exhibition ascents.

To such an earnest gleaner of every scrap of fresh Meteorological information, this suggestion was not an unwelcome one. Consequently our journeys for two or three years were not confined to strictly private voyages to excessive elevations, but embraced many instructive trips on festive occasions, all of which helped the cause we had both at heart, and gratified many who had the honour of ascending with Mr. Glaisher.

But before we appear on the heights of Sydenham, I must allude to my return to Tottenham and of

THE RECEPTION I MET WITH AT HOME.

I do not know whether I shall be charged with mawkish sentimentality in referring to domestic influences, but

these I hold, form as useful an addition to one's auto-biography as the more public and attractive features of daily life.

Respecting the first ascent of my new balloon, I found that gossiping neighbours had expanded and contracted much that the papers had omitted; the main facts I had been told by letter, concisely it is true, and but cautiously communicated, no attempt having been made to explain away a lot of vile rumours, to wit, that we had been frozen to death, and got out of the earth's attraction, and had met with a frightful singeing in a lime kiln; all that sort of thing was bred of spite and calumny, and is not alluded to as worthy of correction; but travels, even in the trackless air, where I have never yet met with any uncomely forms, do somehow occasionally obtain uncanny distortions, and I was not sorry to get back in better trim, and altogether more my old self than when I left home after being so horribly lame and after that dreadful attack of cholera, which drove me to the spirit bottle before I could shake off its effects.

Well, to pursue my narrative, I may observe that if any reader of these disclosures happens to be an anxious wife, united to a person who, having bolted off a short distance clean out of this planet, and having come back a wiser and no worse a man, goes home in an apologetic, rather than a defiant spirit, to account for his absence—such, a reader can imagine, my return from cloudland, and the greeting I undeservedly received. I had aggravated some few relations by defying, as they thought, Providence, and by further courting danger, in wilfully springing from the

frying-pan into the fire, as I was said to have done, and I had to bear the consequences.

"As to taunts, do allow them to entertain their convictions," I said, "but do not dwell on the dark side of the picture. You will soon be wanted," I told my wife, "at the Crystal Palace to be complimented on the success of our united labours. Friend Ohren will be there, and Mr. Glaisher, also the manager, Mr. Boley, who has shaken me warmly by the hand, and here are free passes, so do soon invite our work-people to be ready for an outing, let us have a cordial gathering, and though you do not care for pomp and show, you must needs be there, just to maintain my credit, you know, and your own, and that of all the good people who have helped to send us up. I must away to Sydenham in the morning, as I have to make an inspection of the balloons, but come early next day, and do not stand upon ceremony, and as to my tempting Providence—but there, I have simply tried to advance science and do my duty, we can look up, therefore, and fear no one's taunts, for 'nothing succeeds like success,' and that kind of thing is only too often accompanied by the envy of those who should be the last to speak severely or maliciously of our conduct and intentions."

With these encouraging remarks, I once more entered on a fresh phase of public ballooning.

OUR ASCENT FROM THE CRYSTAL PALACE.

Mr. Glaisher's account was as follows :—

"Mr. Coxwell having planned an ascent with his large balloon from the Crystal Palace, I availed myself of the

ASCENT OF MY MAMMOTH BALLOON FROM THE CRYSTAL PALACE.

[*To face p.* 116.

offer of a seat in the car, for the purpose of taking a series of observations upon the variations of temperature and the several hygrometrical states of the atmosphere at moderate elevations, in each of which paths of enquiry, I had failed to attain satisfactory results in my recent ascent at Wolverhampton.

"The instruments necessary for these investigations were in the hands of Messrs. Negretti & Zambra, and were those, which, having been broken on the occasion of my previous adventure with the same balloon, were confided to them for renewal and repair; they executed their task in a very satisfactory manner, and it is but fair to add that these gentlemen have at all times expressed an earnest desire to promote the experiments required by the British Association. All the other instruments were at Wolverhampton, ready for the next high ascent.

"The balloon left the earth at 4h. 40m. *laden with thirteen gentlemen*, and a large amount of sand and ballast, and under the influence of a moderate breeze, bore away slowly nearly S.E., passing successively Eltham, Dartford, and the village of Singlewell, near Gravesend.

"The heights of the balloon were as follows, at 4h. 43m. 1,340 feet above the level of the sea; at 4h. 49m. 3,700 feet, increasing slowly, until at 5h. 17m. it was 5,300 feet, on throwing out sand it rose to 5,500, and 6,600 feet, by 6h. 12m. it had reached an altitude of 7,100 feet.

"Between 4h. 46m. and 5h. 1m., the altitude and azimuth of the balloon were observed at the Royal Observatory at Greenwich, by E. J. Stone, Esq., M.A.

"The temperature of the air was 68° at the Crystal Palace, at 1,000 feet high it was 62°, at 3,700 feet it was 51°; it continued at this reading nearly till the height of 4,500 feet was reached, at 5h. 4m. and at an altitude of 5,700 feet it varied between 48° and 50°, and decreased from 48 to 43½° between 5h. 31m. and 5h. 38m., the height at the latter time being 6,100 feet. At the height of 7,350 feet the temperature was 41°, being 27° lower than on the surface of the earth. After this the temperature rose gradually as the balloon descended, and was 47° at 6h. 20m., 50° at 6h. 24m., and 68° on reaching the ground.

"The temperature of the dew-point, or that temperature at which the moisture in the air, in the invisible shape of vapour, is deposited as water upon the objects cooled down to this temperature, was as follows:—

"In the Gardens of the Crystal Palace this deposit of water took place when the temperature of the bulb of the hygrometer was reduced by the action of ether to 50°; at the height of 1,300 feet the bulb was bedewed at 43°, between 3,000 and 4,500 feet at 40°, then up to 6,000 feet, at temperatures gradually decreasing; at about 7,300 feet, at a little below 32°, and it afterwards increased to 47° on reaching the earth.

"When the air is saturated with moisture, as in a wetting fog, the temperature of the air and dew-points is the same. On this occasion, on the earth, the latter temperature was 18° below the former, and at the highest elevation 9°, so that the air was nowhere saturated. From a knowledge of the temperature of the dew-point, can be ascertained the

amount of water present in a certain mass of air; this amounted in the grounds of the Crystal Palace to four grains in a cubic foot, at 1,300 feet high, to three grains, at 5,000 feet to two-and-a-half grains, while at 7,300 feet there were only about two grains in a cubic foot of air.

"As the amount of aqueous vapour in the air necessarily decreases with the temperature, the changes of the hygrometric condition of the air at different elevations, may be better understood by speaking of the relative humidity of the atmosphere, air as saturated with moisture being represented by 100, and air without moisture by 0.

"The humidity of the air thus expressed was, on the surface of the ground, fifty, showing an unusual degree of dryness. It increased as we left the earth to sixty-three at 3,000 feet, to sixty-six at 4,000 feet, and to seventy at 7,300 feet; and the air gradually became less humid on approaching the earth. At no point, therefore, was complete saturation met with, as before noticed. The weight of a cubic foot of air varied from 526 grains on the ground to 429 grains at the greatest height reached.

"Similar and simultaneous observations were taken at the Royal Observatory, Greenwich, from which we learn that the temperature of the air on the surface of the ground varied from 67° to 68°, that of the dew-point from 49° to 51°, that there were about four grains of water in a cubic foot of air; the degree of humidity was about fifty, and the weight of a cubic foot of air was 526 grains; therefore the differences at the highest elevations from these values are due to the elevation alone.

"Test ozone papers were not coloured at all, and no ozone was noticed in the ascent from Wolverhampton. We were never in the clouds, although rocky cumuli, which it will be remembered, are the fine massive clouds of the day—were at a lower elevation than ourselves. The sky was free from clouds in the zenith, and of a deeper blue than as seen from the earth. At times there was a great mist, and generally the horizon was hazy and obscure, the shadow of the balloon was seen both on the ground, as well as on the surface of the cloud.

"A horizontal magnet occupied a somewhat longer time to perform a certain number of vibrations, both in this as well as in the previous ascent, than it did on the surface of the earth. This is contrary to the result obtained by Gay-Lussac in 1804.

"At 5h. 24m. a gun was heard with a sharp sound; at 5h. 25m., a drum; at 5h. 26m., a band; at 5h. 38m., a gun; at 6h. 10m., a dog barking, and the working of the engines on the Dover and Chatham Railway, was distinctly heard.

"I have to thank W. F. Ingelow, Esq., for kindly reading one barometer for me, and for rendering considerable assistance in noticing the first appearance of dew on the black bulb of Daniell's hygrometer, enabling me, thereby, greatly to increase the number of my own observations. The gas furnished, must have been of good quality to have raised so great a weight to such an elevation.

"The descent was managed by Mr. Coxwell so skilfully, that no instrument was injured in the slightest degree, and

in fact, the approach to earth was so gradual, that there was scarcely need to steady one's self.

"JAMES GLAISHER,

"Royal Observatory, *July* 31*st*, 1862."

AN UNSCIENTIFIC BUT GRAPHIC DESCRIPTION BY A VOYAGER.

"About ten days ago Mr. Glaisher of the Royal Observatory, Greenwich, made a balloon ascent with the view of ascertaining and registering the temperature, density, and humidity of the atmosphere at an altitude to which previous aëronauts have seldom thought it desirable to mount. Under Mr. Coxwell's able management the new Mammoth Balloon—by far the largest ever constructed, and capable of containing not less than 90,000 cubic feet of gas—reached the enormous height of five miles. It was determined to make similar observations in the lower strata of the atmosphere, and another ascent was accordingly arranged to take place.

"At about four o'clock in the afternooon, the enormous folds of the oiled cloth began to expand as the gas was sent into the balloon. Mr. Coxwell was at his post. Mr. Glaisher, armed with a host of abstruse instruments furnished by Messrs. Negretti & Zambra, took his seat in the car; the favoured few who were privileged to join in the ascent ranged themselves around him, and the balloon being steadied for awhile, a photographic view of it was taken. The Mammoth was then let go amidst a hearty cheer from the spectators. As it was Mr. Coxwell's 507th ascent, and not Mr. Glaisher's first, it is probable that neither of them felt any nervousness on the occasion; but

those who were now about to be introduced for the first time to the regions of upper air received an enormous amount of facetious condolence and sympathy from the friends they left below, which was not altogether reassuring in its character.

"At exactly thirty-six minutes past four the ascent commenced, and the motion was soon found to be as pleasant as it was peculiar. Casting out ballast and rapidly rising, the aerial voyagers soon began to have a view of the Palace which was entirely of a novel character. Palace and gardens, all could be seen at a single glance, and the singular taste and felicity with which the latter had been laid out were far more vividly impressed upon the mind of the spectator, than could possibly have been the case by the ablest description, or the most accurate diagram.

"Before many minutes had elapsed, the Palace looked no bigger than a model; and by the time an altitude of two-thirds of a mile had been attained, the cows in the fields seemed of the size of small flint pebbles. The landscape that gradually opened on the view was of the loveliest that England could show; and as sudden flashes of light lit up and kindled the distant reaches of the Thames into golden glory, which grew more and more intense every minute, all who were not engaged in scientific observations were in ecstacies with the beauty of the scene.

"Farmhouses and outbuildings, rows of pleasant villas, and long straggling village streets, all grew smaller and smaller; away towards London there was a dense haze

that mingled with the smoke clouds of the great city, and hid it from the view; but there was an almost sublime suggestion of Metropolitan grandeur in the very extent of the clouds which were required to conceal it.

"Drifting pleasantly along, rising still, but journeying slowly, the balloon now passed over the village of Eltham. The vast hall, which tradition associates with the name of King John, seemed like the toy-house of a child.

"It was about this time that one of the strangest sensations of the journey began to be observed. This was the seeming disappearance of the whole human race. Not a peasant could be seen in the fields, not a single group of village gossips was to be noticed in the streets. There was a strange loneliness in thus journeying through the air, but it had many charms about it.

"Mr. Glaisher was busily at work; but when he was able to snatch a moment's leisure from his occupation, he joined heartily in the lively talk with which the travellers beguiled the time.

"At an elevation of exactly a mile from the earth, the health of the Queen was proposed, and the philosophic potations of lemonade were followed by the lustiest cheering that ever British lungs gave vent to at such a height. There were thirteen persons in the car, but in despite of this ill-omened number, there were no croakers on board the aërial ship. Everybody was in the mood for enjoyment, and it must have been a dull eye and a feeble brain indeed that could not have rejoiced in the glorious panorama that was unrolled beneath.

"As more ballast was thrown out, the yellow clouds of

sand went floating and wavering gracefully until they were lost to the sight. Meanwhile there was not a brook which the sunshine did not light up into loveliness, and when the vivid rays fell upon any expanse of glass, they seemed to transform a conservatory into a 'koh-i-noor.' Shadows, shifting every moment, wandered and played over woodland and meadow and gorse-covered heath, and even the high roads, winding along past the ripening cornfields, seemed like rivers in the sunlight.

"The cloud scenery now began to develope itself into its full beauty. That every cloud has a silver lining is a popular belief; but it is not the privilege of many to see that the cloud has a surface too of the same metal. There was at one time, if the expression may be pardoned—and it is one which, when used in the car itself, was felt to be appropriate—an absolute snowstorm of sunshine, a flood of lustre and light, which struck either upon the broad bosom of the clouds, or upon their jagged edges, varying every instant, yet only changing from one form of splendour to another. When the eye—almost fatigued with this exuberance of colour—rested again upon the earth, fresh features of interest presented themselves.

"Announced to the car before it was distinctly recognisable by the eye, the march of a body of volunteers now attracted attention. There was a strange fascination about the faint notes of music that came floating up through the air, so distinctly, that at times the tune could be recognised. Indeed, at the greatest height that was reached, the barking of a dog could be plainly heard. The motion of the balloon was slow, and it ascended in a series of spiral

curves, which varied the view incessantly. Very strange it was to see how everything was dwarfed by the distance. Woodlands, full of stately trees, seemed no larger and no taller than the furze-bushes on a common. Railway trains oddly resembled caterpillars as they appeared to crawl along through the deep chalk cuttings, yet the beating of their engines was easily heard.

"There was much haze about the horizon, and some of the effects which are generally seen in ascents were therefore not to be witnessed; but as the balloon reached the greatest height which was intended—namely about a mile-and-a-half—the spectacle, which throughout had been so beautiful, assumed an entirely new character, that of mountainous and Alpine grandeur.

"The cloud cumuli now lay below, though the delicate wreaths and traceries of the cirri were still far above. The enormous clouds appeared now like gigantic castles, now like the fastnesses of Nature herself. Massive buttresses and ramparts seemed to be reared by unseen hands, and so little wind was stirring, that all this gorgeous pageantry of cloudland was not fretted and frittered away before the changing breeze, but remained as though it were destined to endure for ever. As the balloon moved on, its shadow began to be watched with interest by the passengers.

"The Thames, which was being rapidly approached, had lost, by this time, all the glittering brightness of the earlier part of the journey, and, as Mr. Glaisher was satisfied with his observations, and as no one was desirous of drifting down Sea Reach, it was determined to descend.

Mr. Glaisher's health, by-the-bye, had been proposed, and received, with what may be called aërial honours.

"Perceiving that the balloon was now in the neighbourhood of Gravesend, Mr. Coxwell preferred to effect the descent on the south side of the river, though the Essex marshes had been frequently suggested as a good place for the purpose. The fall was rapid at first, but completely under the control of the experienced aëronaut. As the balloon neared the earth, a rather unpleasant prospect presented itself in the shape of a hop-garden. Hop-gardens are exceedingly picturesque in themselves, no doubt, but they were not regarded with any pleasure on this occasion, as their sharp poles became distinctly visible, and seemed ominous of discomfort, if not of danger. Just clearing the poles by a few feet, the car gave a thump as it touched the ground in a field at Singlewell at about a quarter to seven. A pleasant ride to Gravesend, and thence to London terminated an expedition which was in every way most successful and agreeable. Its scientific results will shortly be made known by Mr. Glaisher."

THE UNLUCKY NUMBER OF OUR PARTY.

Although we were thirteen all told, I forget who made up the last and odd number; I rather think it was Mr. — now Sir George Grove. I remember his getting in, very unobtrusively, with a slouched hat on, as if he did not care to be recognised by the sightseers. But we must certainly not pronounce Sir George the unlucky one—possibly it might have been (if the omen holds good) one

of the officers who ascended with me. I cannot say if poor Burnaby was with us on that occasion, but I know that many are long since dead, and, as Mr. Glaisher and I were probably the oldest of the thirteen, it is noteworthy that, notwithstanding the many trials we have had to undergo, we should be still here, while several much younger men have passed away.

The late Mr. Prowse, who wrote the above account for the *Daily Telegraph*, did not live more than two or three years after enjoying this and other aërial voyages.

My esteemed friend Mr. W. F. Ingelow, died suddenly in October, 1886.

A GLANCE AT THE SITUATION.

My new balloon having acquitted herself creditably in accomplishing the allotted elevation of five miles to begin with, and having taken up thirteen persons in a semi-scientific trip from the Crystal Palace, on July 30th, I was pretty well prepared to meet my friends, and to face my traducers, some of whom—and these in the aëronautic line—had declared that "if my hastily made affair would keep up eight persons for an hour, it would be about the extent of her power, and as to going five or six miles, it was impossible with such a heavy, ill-constructed bag. People ought to know better than to entrust themselves to my care." A frightful smash would certainly take place, and then how cruel it was to impose upon, and sacrifice the life of, so confiding a man as Mr. Glaisher.

I just give a sample of the kind of worry which is almost sure to fall to the lot of those who boldly make a

new departure without getting the approval and sanction of persons with whom they have been acquainted; this is frequently held to be an unpardonable act,—"had you asked my advice," some of them argued, "I could have put you right," and if you beg to differ from their conclusions and ask, "but where am I wrong?" then possibly you are told, "in every respect you are wrong" After this, I never paid further attention to what such humbugs had to say, concluding that contempt should be the reward of their folly, so I turned a deaf ear to my critics, and expressing myself grateful for genuine encouragement, proceeded on my way back to Wolverhampton for the next high ascent.

THE SECOND HIGH ASCENT ON AUGUST 18TH.

In looking at the number of pages occupied in giving a description of the two first ascents, I find that a very concise account must be made of the next attempt, so as to leave more space for a narrative of the ascent of seven miles, and I am anxious to tell my own story, and describe my feelings during these awful thirteen minutes when I began to think that the melancholy forebodings I have hinted at, were actually about to be realised.

Mr. Glaisher wrote as follows:—"The weather on the 18th ultimo was favourable, there was but little wind, and that blowing from the N.E. By noon the balloon was nearly inflated, and as it merely swayed in a light wind, all the instruments were fixed before starting, and at 1h. 2m. 38s. p.m., Mr. Coxwell pulled the spring-catch. For a moment the balloon remained motionless, and then

rose steadily, almost perpendicularly. *This ascent was all that could be desired.*

"In about ten minutes we passed through a fine cumulus cloud, and then emerged into a clear space with a beautiful blue sky dotted over with cirrus clouds above. When at the height of nearly 12,000 feet, with the temperature of 38°, or 30° less than on the ground and dew-point 26°, Mr. Coxwell discharged gas, and we descended to a little above 3,000 feet at 1h. 48m., a very gradual ascent then took place till 2h. 30m., when a height of 24,000 feet was obtained, and here a consultation took place as to the prudence of discharging more ballast or retaining it, so as to insure a safe descent, ultimately it was determined not to go higher, as some clouds, whose thickness we could not tell, would have to be passed through. The descent began soon after, and we reached the earth a little after three o'clock at Solihull, about seven miles from Birmingham."

CHAPTER VII.

MR. GLAISHER'S ACCOUNT OF THE HIGHEST ASCENT.

September 5, 1862.

"THIS ascent had been delayed owing to the unfavourable state of the weather. We left the earth at 1h. 3m. p.m.; the temperature of the air was 59°, and that of the dew point 50°. The air at first was misty; at the height of 5,000 feet the temperature was 41°, dew-point 37°.9. At 1h. 13m. we entered a dense cloud of about 1,000 feet in thickness, where the temperature fell to 36°.5, the dew-point being the same, thus indicating that the air here was saturated with moisture. At this elevation the report of a gun was heard. Momentarily the clouds became lighter, and on emerging from them at 1h. 17m. a flood of strong sunlight burst upon us with a beautiful blue sky without a cloud, and beneath us lay a magnificent sea of clouds, its surface varied with endless hills, hillocks, and mountain chains, and with many snow-white tufts rising from it. I here attempted to take a view with the camera, but we were rising with too great rapidity and revolving too quickly to enable me to succeed. The brightness of the clouds, however, was so great that I should have needed but a momentary exposure, Dr. Hill Norris having kindly

furnished me with extremely sensitive dry plates for the purpose. We reached the height of two miles at 1h. 22m., where the sky was of a darker blue, and whence the earth was visible in occasional patches beneath the clouds. The temperature had fallen to the freezing-point and the dew-point to 26°.

,, The height of three miles was attained at 1h. 28m., with a temperature of 18°, and dew-point 13°; from 1h. 22m. to 1h. 30m. the wet-bulb thermometer read incorrectly, the ice not being properly formed on it. At 1h. 34m. Mr. Coxwell was panting for breath; at 1h. 38m. the mercury of Daniell's hygrometer fell below the limits of the scale. We reached the elevation of four miles at 1h. 40m.; the temperature was 8°, the dew-point minus 15°, or 47° below the freezing-point of water. Discharging sand, we attained in ten minutes the altitude of five miles, and the temperature had passed below zero, and then read minus 2°. At this point no dew was observed on Regnault's hygrometer when cooled down to minus 30°. Up to this time I had taken observations with comfort, and experienced no difficulty in breathing; whilst Mr. Coxwell, in consequence of the exertions he had to make, had breathed with difficulty for some time. Having discharged sand, we ascended still higher; the aspirator became troublesome to work, and I also found a difficulty in seeing clearly. At 1h. 51m. the barometer read 10·8in. About 1h. 52m. or later, I read the dry-bulb thermometer as minus 5°; after this I could not see the column of mercury in the wet-bulb thermometer, nor the hands of the watch, nor the fine divisions on any instrument. I

asked Mr. Coxwell to help me to read the instruments. In consequence, however, of the rotatory motion of the balloon, which had continued without ceasing since leaving the earth, the valve-line had become entangled, and he had to leave the car and mount into the ring to readjust it. I then looked at the barometer, and found its reading to be 9¾in., still decreasing fast, implying a height exceeding 29,000 feet. Shortly after I laid my arm upon the table, possessed of its full vigour, but on being desirous of using it I found it powerless—it must have lost its power momentarily; trying to move the other arm, I found it powerless also. Then I tried to shake myself, and succeeded, but I seemed to have no limbs. In looking at the barometer my head fell over my left shoulder; I struggled and shook my body again, but could not move my arms. Getting my head upright for an instant only, it fell on my right shoulder; then I fell backwards, my back resting against the side of the car and my head on its edge. In this position my eyes were directed to Mr. Coxwell in the ring. When I shook my body I seemed to have full power over the muscles of the back, and considerably so over those of the neck, but none over either my arms or my legs. As in the case of the arms, so all muscular power was lost in an instant from my back and neck. I dimly saw Mr. Coxwell, and endeavoured to speak, but could not. In an instant intense darkness overcame me, so that the optic nerve suddenly lost power, but I was still conscious, with as active a brain as at the present moment whilst writing this. I thought I had been seized with asphyxia, and believed I should experience nothing more,

as death would come unless we speedily descended. Other thoughts were entering my mind, when I suddenly became unconscious as on going to sleep. I cannot tell anything of the sense of hearing, as no sound reaches the ear to break the perfect stillness and silence of the regions between six and seven miles from the earth. My last observation was made at 1h. 54m. above 29,000 feet. I suppose two or three minutes to have elapsed between my eyes becoming insensible to seeing fine divisions and 1h. 54m., and then two or three minutes more to have passed till I was insensible, which, I think therefore, took place about 1h. 56m. or 57m.

"Whilst powerless, I heard the words 'temperature' and 'observation,' and I knew Mr. Coxwell was in the car, speaking to and endeavouring to rouse me, therefore, consciousness and hearing had returned. I then heard him speak more emphatically, but could not see, speak, or move. I heard him again say, 'do try, now do.' Then the instruments became dimly visible, then Mr. Coxwell, and very shortly I saw clearly. Next I rose in my seat and looked around as though waking from sleep, though not refreshed, and said to Mr. Coxwell, 'I have been insensible,' he said, 'you have, and I too, very nearly." I then drew up my legs, which had been extended, and took a pencil in my hand to begin observations. Mr. Coxwell told me that he had lost the use of his hands, which were black, and I poured brandy over them.

"I resumed my observations at 2h. 7m., recording the barometer reading at 11.35 inches, and temperature minus 2°. It is probable that three or four minutes passed from

the time of my hearing the words 'temperature' and 'observation,' till I began to observe; if so, returning consciousness came at 2h. 4m. p.m., and this gives seven minutes for total insensibility. I found the water in the vessel supplying the wet-bulb thermometer one solid mass of ice, though I had, by frequent disturbance, kept it from freezing. It did not all melt until we had been on the ground some time. Mr. Coxwell told me that while in the ring, he felt it piercingly cold, that hoar-frost was all round the neck of the balloon, and that on attempting to leave the ring, he found his hands frozen. He had, therefore, to place his arms on the ring, and drop down. When he saw me he thought for a moment that I had lain back to rest myself, and he spoke to me without eliciting a reply, he then noticed that my legs projected and my arms hung down by my side, and saw that my countenance was serene and placid, without the earnestness and anxiety he had observed before going into the ring; then it struck him that I was insensible. He wished to approach me, but could not; and when he felt insensibility coming over him too, he became anxious to open the valve. But in consequence of having lost the use of his hands he could not do this; ultimately he succeeded by seizing the cord with his teeth, and dipping his head two or three times, until the balloon took a decided turn downwards.

"No inconvenience followed my insensibility, and when we dropped, it was in a country where no conveyance of any kind could be obtained, so we had to walk between seven and eight miles.

"During the descent, which was at first very rapid, the

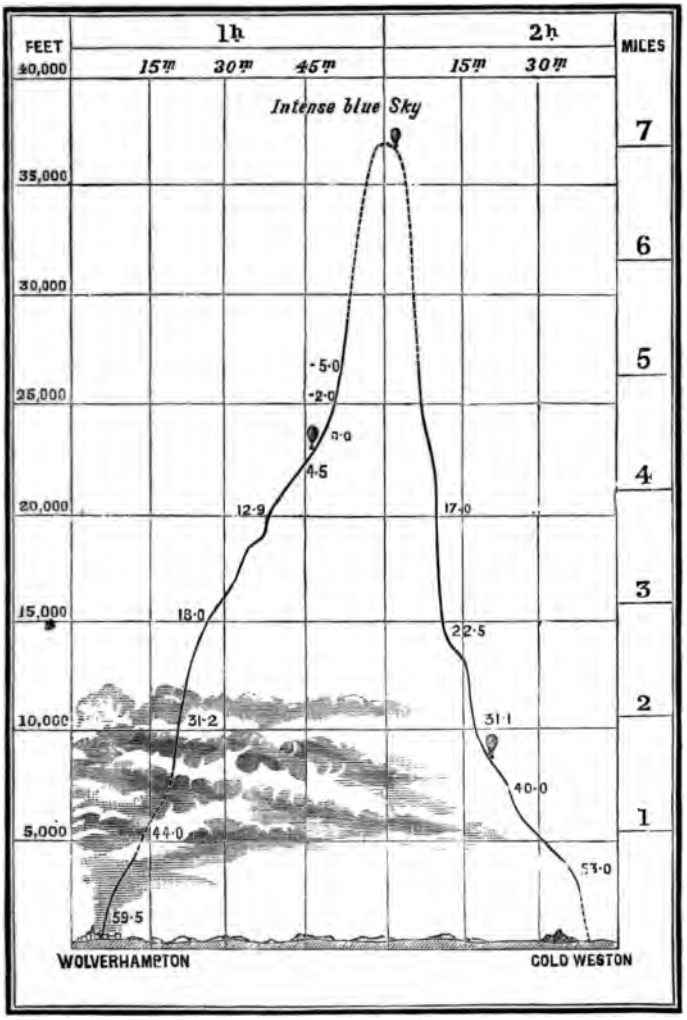
wind was easterly. To check the rapidity of the descent, sand was thrown out at 2h. 30m. The wet-bulb seemed to be free from ice at this time, but I held the bulb between my thumb and finger, for the purpose of melting any ice remaining on it or the connecting thread, the readings after this appeared correct. The final descent took place in the centre of a large grass-field belonging to Mr. Kersall, at Cold Weston, seven and a half miles from Ludlow.

"I have already said that my last observation was made at a height of 29,000 feet, at this time (1h. 54m.) we were ascending at the rate of 1,000 feet per minute, and when I resumed observations we were descending at the rate of 2,000 feet per minute, These two positions must be connected, taking into account the interval of time between, viz. thirteen minutes. And on these considerations, the balloon must have attained the altitude of 36,000 or 37,000 feet. Again, a very delicate minimum thermometer read minus 11.9°, and this would give a height of 37,000. Mr. Coxwell, on coming from the ring, noticed that the centre of the aneroid barometer, its blue hand. and a rope attached to the car, were all in the same straight line, and this gave a reading of seven inches, and leads to the same result. Therefore, these independent means all lead to about the same elevation, viz., fully seven miles.

In this ascent six pigeons were taken up. One was thrown out at the height of three miles, when it extended its wings and dropped like a piece of paper; the second, at four miles, flew vigorously round and round, apparently taking a dip each time; a third was thrown out between four and five miles, and it fell downwards as a stone. A

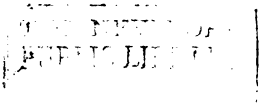
fourth was thrown at four miles on descending; it flew in a circle, and shortly alighted on the top of the balloon. The two remaining pigeons were brought down to the ground. One was found to be dead, and the other, a carrier, was still living, but would not leave the hand when I attempted to throw it off, till, after a quarter of an hour, it began to peck at a piece of ribbon with which its neck was encircled; it was then jerked off the finger, and shortly afterwards flew with some vigour towards Wolverhampton. One of the pigeons returned to Wolverhampton on Sunday the 7th, and it was the only one I ever heard of.

"In this ascent, on passing out of the clouds there was an increase of 9°, and then there was no interruption in the decrease of temperature till the height of 15,000 feet was reached, when a warm current of air was entered, which continued to 24,000, after which the regular decrease of temperature continued to the highest point reached. On descending, the same current was again met with, between 22,000 and 23,000 feet. A similar interruption, but to a greater amount, was experienced till the balloon had descended to about the same height at which it was reached on ascending; after this no further break occurred in the regular increase of temperature, the sky being clear till the descent was completed. From the general agreement of the results as observed by Regnault's hygrometer, and those of the dew-points found by the dry and wet-bulb thermometers, there can be no doubt that the temperature of the dew-point at heights exceeding 30,000 feet, must have been as low as minus 50° below zero of Fahrenheit's scale, or 82° below the



ASCENT OF MR. GLAISHER AND MYSELF TO AN ELEVATION OF SEVEN MILES.

[*To face p.* 136.



freezing-point of water, implying that the air was very dry."

MY OWN RECOLLECTIONS OF IT.

After a retrospect of our highest ascent, I came to the conclusion, and this has not been materially modified by more recent thoughts, that the line of action which, at the time I considered desirable to pursue, was the best adapted to ensure success.

When first gas was passed into the balloon, on the morning of September 5th, it was not long before I perceived that the plan which Mr. Proud and I had agreed on for the production of a very light gas answered admirably, and, indeed, that a much superior description had been generated and stored than had been originally promised.

Aëronauts, that is attentive, observing, aëronauts, even if they have been made acquainted with the specific gravity of the gas before commencing to use it, are enabled to form their own opinions as to its lightness, by noticing the way in which the valve is raised from the ground after a few thousand feet have passed into the crown of the balloon. And it was not long before I perceived a great difference in this respect alone, when we came to draw comparisons between the previous inflations at Wolverhampton.

I remember complimenting the accomplished engineer, and then exchanging congratulations with Mr. Glaisher as to the splendid gas with which we had that day been supplied. As I went round and round the balloon and loosened the fastenings, I pointed out the unusual tugging

of the net work on the large sand bags, and this was a sure indication of great additional power—I mean at so early an hour after commencing. It was then noticed how pleased I appeared to be with the prospect of being able to accomplish a much higher ascent that on either of the two former trips, and here I may observe that the lesson of the first trial was this, viz., that the work had to be done expeditiously, for in going from Wolverhampton when the wind was towards the east, the enormous curve of an altitude of five or six miles compelled us to go up and come down with uncommon rapidity, in order to avoid our being carried too near the coast to be either safe or pleasant.

On the first occasion we drifted towards the Wash, and in descending we had to pass through large masses of cloud, one being 8000 feet thick.

Another lesson, taught by the second journey to Solihull, was that the balloon was tighter than at the first trial, as we retained and brought down a very large amount of ballast. These two points ascertained, I felt that with still lighter gas I could venture to take Mr. Glaisher up to a much higher elevation, and as no symptons of fainting had been felt previously, I concluded that we might risk a more spirited rise, for it would never do to come down in a mountainous district during thick mists or the instruments might be broken by sudden contact with a hill top.

On September 5th our course was towards the west coast, so that we went in a diametrically opposite direction to that taken on July 17th. Had the wind been north or

south there would have been a much longer run for us. I mention this to account for the necessarily rapid rise on September 5th, which may have helped to increase the frequent spinning of the balloon and to add to a susceptibility to giddiness though this would not be so much felt high up owing to the total absence of all visible objects. It is just possible, however, though I am not at all sure about it, that a sudden transition to colder and lighter air might have increased the tendency to asphyxia, but on the other hand had we crept aloft and drifted away to the coast much faster than we did, a much greater danger would have been encountered, so that all things considered we could not have proceeded in a better way than that we actually took.

Situated as we were, the balloon was not so very dissimilar to a ship which is about to be launched, say for example on the Clyde, or from a building yard at Blackwall, where the creek or river is of narrow dimensions, and where special precautions have to be observed in stopping the vessel almost suddenly when she has cleared the ways, for fear she grounds on the opposite shore.

In these very high ascents there is much that should be thought over before-hand. Mere dash and daring—so much admired in a certain class of balloonists—might prove to be a dangerous element in this particular kind of ballooning. Had I not well thought out all the different positions in which we were likely to be placed, I could not have been equal to the requirements of each case as it presented itself.

A balloon in rising to the height of six or seven miles after being only two-thirds inflated, undergoes a variety of changes, both as to breadth, length, and general shape before it attains its highest point, and when the descent takes place they are vastly increased. The volume of gas which has filled the balloon at the maximum elevation does not occupy more than the top part on reaching the earth after her downward progress; therefore a mass of elongated loose cloth is flapping about, which if not narrowly watched may close upon the other side of the balloon and so tightly embrace the valve-cord as to open the shutters without, perhaps, the aëronaut being aware of it. Certainly in my own case I had fixed additional strong springs to the valve, still I found that when a quick fall was imperative, a number of novel and awkward positions had to be seen to, or we might have been confronted with difficulties of an aggravated character, and there is no room for doubt that high ascents require very special kind of treatment. The ordinary perils of this mode of travelling are here multiplied ten-fold, and if anything goes wrong when the machine is far distant from the earth, the chances of preserving life are few indeed, as a rupture of the cloth may extend from top to bottom or the entire gas may escape before the ground is reached, in which case death would be the penalty.

Though watchful as to all these diversified situations, I could not reveal or allude to them when Mr. Glaisher was intent on his observations, and when so large a share of confidence had been placed in my management that he sat, to use his own metaphor, as if he were at the Royal Observatory.

As regards myself, however, with the knowledge that they might at any moment present themselves, I had to be ever watchful and cautious, and at the same time ready for a bold effort if need be.

In Mr. Glaisher's graphic account, he alludes to the continued rotation of the balloon and the necessity for my mounting into the ring to get possession of the valve-line. I may here explain that the ropes which attach the car to the hoop had been made much longer than usual, so as to give extra length to that portion of the aërial apparatus; this increased the distance which I was suddenly compelled to climb, as the line had been carefully placed in a sort of pocket on the hoop, and there was an additional length added on, so as to admit of several small coils that would pay out if the slightest strain on them was exerted. The lower safety valve or opening at the neck had been enlarged with the idea of avoiding the use as much as possible of the large upper valve, and when Mr. Glaisher's troubles commenced, I was absorbed in my own duties which prevented me from noticing my colleague's uneasiness. I thought that his eyes were dazed by the constant use of a lens and did not perceive that insensibility was approaching. The premonitory symptoms were not thought to be anything more than a desire for a few moments' quiet, and when I really began to apprehend that something was amiss, I looked up far above the balloon for Supreme help, and then found myself springing aloft to do what at this critical juncture seemed necessary.

I had previously taken off a thick pair of gloves so as to

be the better able to manipulate the sand bags, and the moment my unprotected hands rested on the ring, which retained the temperature of the air, I found that they were frost-bitten, but I did manage to bring down with me the valve line, after noticing the hand of the aneroid barometer, and it was not long before I succeeded in opening the shutters in the way described by Mr. Glaisher.

After making this effort, I entreated my pale but placid looking companion to try an observation, but all was silent, so that in this position I felt an amount of anguish which can be better imagined than described.

Again, on letting off more gas I perceived that the lower part of the balloon was rapidly shrinking, and I heard a sighing as it were in the network and the ruffled surface of the cloth. I then looked round, although it seemed advisable to let off more gas, to see if I could in any way assist Mr. Glaisher, but the table of instruments blocked the way, and I could not with disabled hands pass beneath, my last hope then was in seeking the restorative effects of a warmer stratum of atmosphere. Again I tugged at the valve line, taking stock meanwhile of the reserve ballast in store, and this happily was ample.

Never shall I forget those painful moments of doubt and suspense as to Mr. Glaisher's state when no response came to my questions; I began to fear that he would never take any more readings. I could feel the reviving effects of a warmer temperature, and wondered that no signs of animation were noticeable; the hand of the aneroid that I had looked at was fast moving, while the under part of the balloon had risen high above the car. I had looked

towards the earth and felt the rush of air as it passed upwards, but was still in despair when Mr. Glaisher gasped with a sigh, and the next moment he drew himself up and looked at me rather in confusion, and said he had been insensible, but did not seem to have any clear idea for how long, until he caught up his pencil and noted the time and the reading of the instruments. When after disguising any emotional feeling, I told him of my own inconvenience, he rubbed my hands with brandy. I was so much transported with delight at his recovery that I availed myself of his services to help me in discharging sand, for we had dipped 19,000 feet in a quarter-of-an-hour, and were still falling fast, which required checking; as the crisis had Providentially passed, it was better to sail along at our then level, or we might expend too much sand if we allowed the balloon to drop another mile or two at the speed we had been going down. When the balloon was brought to her equilibrium there was a mutual explanation, but Mr. Glaisher kept on dotting down his observations, and we did not discuss the dangers we had surmounted.

How sweet and life-giving was the delicious atmosphere as we came near the ground! We were like convalescents taking in copious draughts of sea air after leaving a pestilential city.

Glad enough was I to perceive the customary freshness return to Mr. Glaisher's face. The act of casting about for a suitable landing-place afforded I thought an opportune diversion, and glad I was that we had cast aside our previous anxieties, the pleasing excitement and purer air having acted as the best restoratives.

We found ourselves, as already narrated, at Cold Weston, but we had to walk for seven or eight miles before a railway station was reached, and as no train was departing for some time we sought an hotel, and asked for a substantial dinner, but to our disappointment, for we were hungry, nothing but chops were to be had; we did not appear to be alone in this state of suppressed appetite, however, as another gentleman was in the room awaiting refreshment, and it seemed that he had long given his order. The waiter arrived first with his dish, but on removing the cover it was seen to contain delicious-looking fish. "Confound that waiter," I muttered, after he had left the room, but I had him when he returned with the potatoes and the sauce.

"Look here, waiter, have you no fish for us?"

"No, Sir, no, that gentleman is an angler, and provided his own dinner."

But if I am not mistaken, we did get a taste after Mr. Glaisher had been to telegraph our whereabouts. It had incidently been disclosed whence we had come. After that we might have had, I verily believe, all the fish that the astonished angler had taken. We lost no time in attending to trifles, but got on our way rejoicing as far as we were able, and early next morning Mr. Glaisher's report was written before and during breakfast, and duly appeared in the newspapers.

THE HIGHEST ASCENT ON RECORD, LEADING ARTICLE FROM "THE TIMES" OF SEPTEMBER 11TH, 1862.

"Poetry has described some famous *descents*, and the *facilis descensus Averni* comes back with a familiar school

twang to us. These dips into the subterranean world do not, indeed, belong to the region of historical truth, nor do they even profess to have been made for scientific purposes; yet, perhaps, they symbolise a certain spirit of discovery appropriate to those ages. The two chief adventurers into those parts, the two epic heroes, were great travellers,—the explorers of their day. Science has just now, however, surpassed all the fancy of poets. We have just had an *ascent* such as the world has never heard of or dreamed of. Two men have been nearer by some miles to the moon and stars than all the race of men before them. It is true they do not bring back a very glowing account of their approach to the region of the empyrean, yet their voyage upwards is not without poetical features. On reaching the clouds they find themselves among strange phenomena. They cut through a dense mass of moisture 2,000 feet in thickness, after which the scene changes, they are received out of the thick fog into the clear blue vault of a liquid sky, and see the landscape of clouds beneath them.

"Mr. Glaisher attempts a photograph of the beautiful scene, but the rapidity of the flight defeats the process, and as the car mounts upwards the paper refuses to receive the constantly vanishing impression from below. They now reach a fearful altitude, where pigeons, the unhappy victims of all experiments, cannot fly, and where, at last, the rarity of the air is too great for the physical structure of man, and one of the explorers faints and becomes unconscious. Yet such is the determination of men when they are in the act of experimentalizing, and at the very

climax of their feat, that they will not spoil it by a check so long as progress is possible; on they will go, and grudge forestalling their vertex by a foot, for every foot is so much gain and so much triumph.

"For ten whole minutes, Mr. Coxwell ascended alone, or rather worse than alone, with his companion insensible before his eyes, in a region seven miles distant from the earth. That is a very extraordinary ten minutes if we think of it, that solitary command without a rival, of the boundless regions of space, when, for once, to be "alone in the world" was not a metaphor, and one head was working in the infinite void. It deserves to take its place among the unparalleled junctures and the critical and striking moments of war, politics, or discovery. But the feat was almost too audacious, and was carried on to the very verge of fate. Mr. Coxwell was only just in time to take the step which was necessary for a return to the lower world; another minute and he would have been stretched by the side of his companion, and a car, containing two human bodies, would have been mounting to worlds unknown, and encountering aërial storms and shipwrecks so removed from all our sublunary experience that we can hardly form the faintest image of the reality. We know enough of the geography of the heavens to know that it would not have been even dashed upon the bleak shore of a planet, or found a resting place upon some Ararat in the moon. But Mr. Coxwell's mouth performed the task which his paralysed hands were unequal to, and the release of the gas procured a descent, and gave a safe termination to the most audacious aërial feat ever performed.

"The courage of men of science deserves to have a chapter of history devoted to it. It has been observed that courage is a very capricious and inconsistant virtue, and we all of us know the old anecdote of the gallant veteran of a hundred battles who durst not snuff out a candle with his fingers. Courage is a thing of habit, and sometimes it fails altogether immediately it is out of the field of its habit. Your bold rider is one who has begun young and becomes a sort of Centaur, only with the convenience of dropping off the animal part of his figure when he chooses; his whole body, with its muscles and sinews, has accommodated itself to the back of a horse, and acquired an intuitive and unconscious balance. But take him off his horse and, unless he has the *principle* of courage within him, he is an ordinary mortal, and no more likes breaking his neck than a quiet humdrum citizen.

"A soldier is accustomed to courage in company with gallant fellows around him, but that makes an immense difference. Company is both inspiring and relieving, it divests courage of its horrors and gloom, it is therefore much easier to be bold in company. But send your bristling warrior a nocturnal walk along a lane, and he sees ghosts peeping from behind haystacks, and hears supernatural voices in ever gust of air. The feats of a man of science give you a better guarantee for real courage, because they are solitary, deliberate, calm, and passive. It is true he has his enthusiasm which helps him, and he has his field of courage to which he has accustomed himself. But every new adventure, every fresh essay upon this field is a solitary effort and impulse to him. He has to fight alone

and by himself against the faintness of nature, without men shouting or flags flying, or trumpets clanging around him. He faces the invisible forces of nature, the gas that explodes or the poison that penetrates, with the countenance of a student and philosopher, and is at the disadvantage of having to be fully conscious and self-possessed, instead of having the aid of the swing and impetus of passion. The cool feats of our scientific men are known to us all—such as that of Sir Humphry Davy inhaling a particular gas, with an accurate report every minute or two of its successive effects upon his brain and senses. The aërial voyage just performed by Mr. Coxwell and Mr. Glaisher deserves to rank with the greatest feats of experimentalizers, discoverers, and travellers. It is true these gentlemen have not brought down a very comfortable or inspiring report of the upper world into which they have penetrated. Science and poetry are unhappily rather at variance upon the subject of the air and sky.

"Poetry points upwards to the sky with glowing rapture as the scene of brightness and glory, and a residence there figures as the reward of heroism and greatness. Everything is happy and splendid that is connected with the sky. But science penetrates with its material eye into these vast upper spaces, and simply reports a great difficulty of breathing there, that the blood stagnates, the limbs become benumbed, the senses evaporate, and nature faints in unconsciousness. The very birds will not fly in that sky which is their poetical home. The distinction is that poetry looks up to the sky from below, and science examines and feels it on a level. The sky is the emblem of poetry,

the fact of science. Both aspects of it are equally true, but the point of view from which they are taken is quite different. But, though our recent explorers of the sky do not add to its brilliancy as a picture, they have furnished one more striking and impressive scene to the history of science. They have shown what enthusiasm science can inspire, and what courage it can give. If the man, as the poet says, had need of "triple steel about his breast" who first launched a boat into the sea, certainly those had no less need of it who first floated in the air seven miles above the surface of the earth."

COXWELL AND GLAISHER:

A Song by a Schoolboy. From *Punch*.

1.

"'Tis of the youthful Icarus
The ancient poet sings,
For whom his daddy, Dœdalus,
Made certain waxen wings;
But, flying up too near the Sun,
His wings of wax did melt,
And then he came right down like
As hard as he could pelt. [fun,

2.

"A great deal faster than he rose
Apace descended he,
Until he ended all his woes
In the Ægean Sea.
Now what a lie is that account!
About the hour of noon
Glaisher and Coxwell both did mount
Six miles in a balloon.

3.

"No mortal man could soar so high,
Because, at that great height,
A pigeon they let out to fly,
Could not effect its flight.
Half stifled for the want of breath
Was Coxwell, Glaisher too;
Glaisher was nearly froze to death,
And Coxwell's hands turned blue.

4.

"Aloft 'tis cold instead of hot;
Wax wings would freeze, not run,
By which a chap as near had got,
As could be, to the Sun.
As snow upon a mountain's top
Might show to every fool,
So that slow fable you must drop
That we are taught at school.

5.

'But Glaisher's pluck, and Coxwell's
Is something to admire; [too,
As high as eagle ever flew
These fellows went, and higher.
One kept on reading at his glass,
Whilst he could see or stand;
The other's teeth let out the gas,
When cold had numbed his hand.

6.

"'Tis true that these two men did go
Six miles towards the sky;
But as for Icarus, we know
That story's all my eye.
Then what's the use to read about
Old heroes fabled acts,
When now they're beaten, out and out,
By wonders that are facts?" [out,

CHAPTER VIII.

GOVERNMENT WAR BALLOONS.

NOTWITHSTANDING the way in which my time was occupied in the year 1862, I was seldom long silent as to my proposals for the adoption of military ballooning in this country. I find that in the *Army and Navy Gazette*, as well as *The Times*, I contributed two letters in the first and last month of that year, which I shall reproduce with the object of showing who was really the leading advocate on this subject long before our present military aëronauts were known or appointed.

I take the following, verbatim, from my scrap-book :—

"Mr. Coxwell, the well-known aëronaut, makes the following observations on this interesting subject in the *Army and Navy Gazette* :—

"The authorities having given due consideration to this subject, as mentioned in your impression of December 28th, public opinion is, no doubt, gratified by the intimation, as it forms one of many proofs that the modern arts and appliances receive at the present time careful attention at the War Office, and are properly estimated according to their merits.

"No sooner had warlike preparations commenced in England than I made a proposal for the employment of

balloons in Canada. Having stood forward so long in this particular line of advocacy, I feel encouraged to find that a branch of science which has so long been resorted to for amusement only, should at length be held worthy of a more dignified and useful application.

"The adoption of balloons in warfare should not alone be confined to reconnoitring, but to *destructive purposes* as well.

"Dr. Lardner, in a letter to *The Times* on March 31st, 1859, mentions some chemical compounds of a highly-poisonous character, which may be used in shells.

"If ever ballooning should become recognised in military science, it is most probable that aërial shells, raised by balloons, and disunited by means of a fusee, or by concussion caps, may be used with as much precision as iron shells thrown from mortars. I have no doubt it would be possible to drop with tolerable nicety a host of aërial shells charged with agents calculated to produce stupefaction, if not fatal effects, and if by this means prisoners could be made instead of increasing carnage, humanity would rejoice at so ingenious a method.—*January* 11*th*, 1862."

MILITARY BALLOONS.

"To the Editor of *The Times*.

"Sir,—In the recent battle in America we again hear of the application of the war balloon.

"Scientific reconnoitring from an elevated position has been within the last four years successfully adopted, both in the Old World and the New.

"The letters which you have done me the honour to

publish on this subject *may one day be referred to as a proof that* constant attention has been called to it by a practical man and an Englishman, but that it would have no effect until some foreigner or imitator came forward and carried all before him.

"About this time last year I proposed to the authorities a series of experiments, to show what might be done with a balloon in aid of military science.

"I met with little encouragement, however, although for many years I have studied and pointed out the ways in which balloons can be employed with advantage.

"In an aërial voyage from Winchester barracks about three months since I ascertained the opinions of a party of officers during our transit near Aldershot Camp, and every one agreed that the utility of balloons for the use proposed would be immense, and that the idea only required proper introduction to be well received.

"Perhaps, Sir, with your valuable aid, the time may arrive when this passing allusion may lead to beneficial results.

"I remain, etc., HENRY COXWELL,

"*December* 29*th*, 1862."

THE WINCHESTER ASCENT.

SEVENTY MILES IN SIXTY-SIX MINUTES.

"To the Editor of *The Times*.

"Sir,—A most successful aërial journey has this day been accomplished from Winchester to Harrow, travelling at the rate of a mile and more a minute.

"Colonel McDonald and six officers of the Rifle Depôt

Battalion accompanied Mr. Coxwell in his mammoth balloon.

"Before the ascent could be performed great anxiety had been felt by all concerned, the distance from the gasometer being half-a-mile, and the last hundred yards of piping having to be laid above ground through the passages to the inner quadrangle. As the pipe was only four inches in diameter, the filling had to commence at nine o'clock

THE ASCENT FROM WINCHESTER.

on Monday morning. The weather was tempestuous, and strong equinoctial gales blowing from the south-west, bringing heavy clouds with rain almost precluded any hope of our voyage being either pleasant or safe. Owing to the zeal of Mr. Tinney, the gas manager, who spared no labour in providing the 90,000 cubic feet of gas—no ordinary task—and also to Mr. Coxwell's knowledge of the change-

ableness of the weather, the enterprise was not abandoned. All the arrangements, made with calculation and forethought by Colonel McDonald, were successfully completed, every preparation for the convenience of visitors was arranged, and the ancient palace of Charles II. assumed the appearance of a Roman amphitheatre.

"Owing to frequent squalls, it was undecided at three o'clock whether the ascent should be made this day or postponed. A large crowd was, as usual, clamorous and foolishly careless of any risk, but it would have had no effect in inducing Mr. Coxwell 'to proceed,' had not the sun come out and the heavy clouds dispersed. Then he decided, and the soldiers, obeying his signals with military exactness, drew the balloon to the windward side of the square, and at five minutes past four the rope was let go, when we instantly rose in a majestic manner, clearing the corner we had so much feared by 150 feet, and going eventually to the height of two miles. By passing over the Grange (Lord Ashburton's) eight minutes later we perceived that we were going at the rate of a mile a minute. The white and broken clouds were on this occasion between three and four miles from the earth.

"Our direction was E.N.E. We passed Aldershot Camp two miles to the S.E., Virginia Water a mile to the N.W., and with great pleasure recognized the friendly shelter of Harrow Hill for a descent. This, however, we passed by a mile, and landed in a grass field belonging to Mr. Henry Hill. Here in the gentlest manner possible, the strong wind having suddenly dropped, the grappling iron anchored us in the centre of the field, and, thanks to

Mr. Coxwell's judgment, without the slightest concussion. With the hearty good will of the villagers, and the obliging assistance of Mr. Hill, we packed up and carried the balloon to the railway station. It was 5.15 when we descended, and the distance travelled in one hour and ten minutes exceeded seventy miles.

"Obediently yours, C. F. T.

"London, *October* 14*th*.

"N.B.—The party consisted of Colonel McDonald, Major Newdigate, C. Ramsbottom, W. M. Burrell, C. Fairfield, Hatton Turnor of the Prince Consort's own Rifle Brigade, and J. S. Algar of the 60th Rifles."

COLONEL MACDONALD'S ACCOUNT.

"Mr. Coxwell having stated to me that our flight in his balloon from Winchester to Harrow was one of the most interesting which has been made, I am disposed to offer a few additional observations to those of your previous correspondent.

"He made a slight mistake in the time in which the journey was performed, the distance being got over in one hour and six minutes—four minutes less than he computed.

"It being necessary to move upwards with great velocity an additional interest attached to the ascent. The moment the rope was loosed by our guide, we felt first a gentle movement, then a bound into space, almost a realisation of the translation of good men of old. It is hardly possible to describe how this movement outstripped thought. A fleeting vision passed the minds of friends near becoming instantly distant, amid the waving of handkerchiefs, the

strains of music, and the cheers of the crowd; we were high in air, however, before we could return these salutations.

"At this period of our velocity we were moving probably at the rate of much more than a mile a minute, as our course described a parabolic curve, the balloon being moved by two forces—upwards by the dense masses of the lower air, and northwards by the wind. This pace gradually lessened till we reached our extreme altitude, upwards of two miles, when we took the more moderate rate of about seventy miles an hour, and travelled at the same elevation, after which we descended in a parabola of less inflection upon Staines; this descent was of great velocity, although the only effect felt by the aëronauts was the rotation of the balloon slowly. This was rapidly checked by the delivery of sand, when for some time we preserved an altitude of about 900 feet; subsequently it became necessary to ascend to 1000 feet to clear Harrow Hill with the grapnel, which now hung 100 feet below us, and was a scale by which we could estimate height, and our altitude was now gradually lessened until the descent was accomplished.

"It was interesting to note the difference of the aërial currents. Until we passed over Staines, rippled waters were observable, and we anticipated a rough descent; near there, however, some smoke was seen to blow towards the west although our direction was previously more northerly, this indicated a different current of wind. After our descent upon Staines, we noticed our pace was diminished, and that we were probably moving at the rate of about

thirty-five miles an hour, which pace appeared uniform until half-a-minute before touching ground, under the shelter of the hill.

"London was to be seen, a great bank of fog with buildings in its outskirts which we left on our right. I ought not to forget to mention a very brilliant effect produced by the sun striking on a cloud over the Isle of Wight. The cloud shone with an intensity equal to electric light. Nor should I forget our passage over the familiar scene of much military pomp in which we had figured—the great dust plain and hideous huts of Aldershot. There a solitary bugle call was detected by the sharp ears of Mr. Coxwell, *who pointed out the value of balloons in military reconnaissance.*

"At the height of two miles, any manœuvres upon the dust plain could have been easily seen. Even troops secreted behind the reservoir, or in the hollows of Cæsar's Camp, would have been unable to hide from the searching eye of the aërostatic observer."

A STEP IN THE RIGHT DIRECTION.

There can be no two opinions that although this remarkable journey was of a non-official character, still the utterances of Colonel MacDonald must have entitled his remarks to great weight, considering his services in the Crimea and elsewhere. The Colonel being accompanied too by brother officers who supported him in his outspoken conviction as to the value of the balloon for military objects, this experience helped vastly to further my oft repeated suggestions, and it will be seen that it was not very long before I was called upon in conjunction with

Captain F. Beaumont, and Lieutenant Grover, to make the first military ascents from Aldershot Camp and Woolwich Arsenal.

THE BRITISH ASSOCIATION AT CAMBRIDGE.

The London Review, in alluding in humorous terms to this meeting on October 11th, 1862, stated that it was remarkably deficient in *lions*. "The lady associates had few or no celebrities to gaze upon, and were forced to content themselves with people who have been seen everywhere for years—good steady folk, who wear well, like Mrs. Primrose's wedding gown, or with a few specimens of the miserable class of men who *were* lions a season or two back, and are now passed by.

"M. du Chaillu attended the geographical section, and M. Simonides exhibited some recently discovered manuscripts.

"The nearest approach to the genuine lion was, perhaps, Mr. Glaisher, whose narrative of his balloon ascents attracted a crowd to the Hall of Sidney, Sussex College, and secured for him and the intrepid *Coxwell* (led forward by Colonel Sykes) immense applause."

The Cambridge University Journal gave a three-column report of the lecture. "In section A," it said, "Mr. Glaisher read an intensely interesting paper upon eight balloon ascents (for scientific purposes) which he made in company with Mr. Coxwell this summer." But the opening remarks are all that I shall refer to, as much of the meteorological parts have been previously introduced. The following extracts are, however, fresh.

"All philosophical enquiries carried on or near the surface of the earth are of necessity fully within its

influence, and consequently within the influence of many disturbing causes. By no other means than the use of the balloon can we free ourselves from these disturbing influences. Let us consider what sciences must be thereby benefited, chemistry probably, magnetism certainly, and meteorology and astronomy. When we regard the influence which a clear sky or a cloudy one exercises upon the temperature, and so upon our comfort and well-being generally, we see the importance of cultivating an acquaintance with the higher regions and increasing our knowledge of aërial phenomena.

"Three of the ascents were made from Wolverhampton, four from the Crystal Palace, Sydenham, and one from Mill Hill, near Hendon, where the balloon had fallen the night previously, and where Mr. Coxwell wished to keep it, so that we could witness *Sunrise* the next morning, and then go to a greater height than on the previous evening.

"By half-past four next morning we again left the earth on August 21st, and there were in the car besides Mr. Coxwell and myself, Captain Percival and my sons. At 4.57 we were in a cloud surrounded by white mist. The light rapidly increased, and gradually we emerged from the dense cloud to a basin surrounded by immense black mountains of cloud far above us, and shortly afterwards we were looking into deep ravines of grand proportions, bounded by beautiful curved lines. By 5.31 we were somewhat less than three miles high, at which elevation we continued about half-an-hour. We gently reached the ground at Dunton Lodge, near Biggleswade.

"The principle conclusions adduced from these obser-

vations are that the temperature of the air does not decrease uniformly with the height above the earth's surface, and that consequently more elucidation upon this point is required, particularly in its influence on the law of refraction; that an anëroid barometer can be made to read correctly certainly to the first place, and probably to the second place of decimals to a pressure as low as five inches; that the humidity of the atmosphere does decrease with the height with a wonderful increasing ratio, till at heights exceeding five miles the amount of aqueous vapour in the atmosphere is very small indeed; that we now can answer the question that observations can be made as completely in the balloon as on the earth; that at heights exceeding four miles they cannot be made quite so well, because of the personal distress of the observer; that at five miles high it requires the exercise of a strong will to make them at all, that no one who has heart disease or pulmonary complaints should attempt four miles high. But at the same time it must be born in mind that the balloon is properly handled.

"It has been fortunate for the Association and for myself that we have the assistance of Mr. Coxwell; he has the experience of more than 400 ascents, based upon knowledge of natural philosophy, and knows the why and because of all his operations, and it was this fact, which I saw immediately from the clearness of his explanations to me for each operation, that enabled me to dismiss from my mind all thoughts of my position, and to concentrate my whole energies upon my duties. In conclusion I feel certain that if these experiments from the balloon are

available for philosophical research, one of the brightest links in the long chain of useful works, performed through the agency of the Association, will be the proving that the balloon in proper hands, may be made a powerful philosophic agent."

ASCENT FROM THE CRYSTAL PALACE,

April 18*th*, 1863:

MR. GLAISHER'S ACCOUNT.

"In this ascent the balloon was partially filled during the evening of April 17th, with the view of starting early the following morning. The atmosphere was at this time thick and misty: the wind on the earth was N.E., but pilot balloons on attaining a moderate elevation fell into a north current. The wind was moving at an estimated velocity of forty miles an hour, and the ascent was delayed hour after hour, with the hope that the upper current would change to N.E. At 1h., when the sky was nearly covered with clouds, and there were occasional gleams of sunshine, the ascent was decided upon, although it was evident it could not be one of long duration, unless the wind changed its direction, or we resolved to cross the Channel. Whilst discussing this, the rope, our only connecting link with the earth broke, and at 1h. 17m. we started very unceremoniously, the balloon making a great lurch as it rose; I was thrown among my instruments, and unfortunately both Daniell's and Regnault's hygrometers were broken. Within three minutes we were more than 3,000 feet high. At 4,000 feet, cumulus clouds were on our level, and a thick mist rested everywhere on the earth. At 1h. 26m. we were 7,000 feet

high, in a thick mist which almost amounted to a fog. The temperature of the air continued at nearly 32°, whilst that of the dew-point increased several degrees. On passing out of the cloud these two temperatures very suddenly separated, the latter decreasing rapidly; the sky was of a deep blue, without a cloud on its surface. At 1h. 30m. we were 10,000 feet high; directly under us was a sea of clouds. The towers of the Crystal Palace were visible, and by them we found we were moving south.

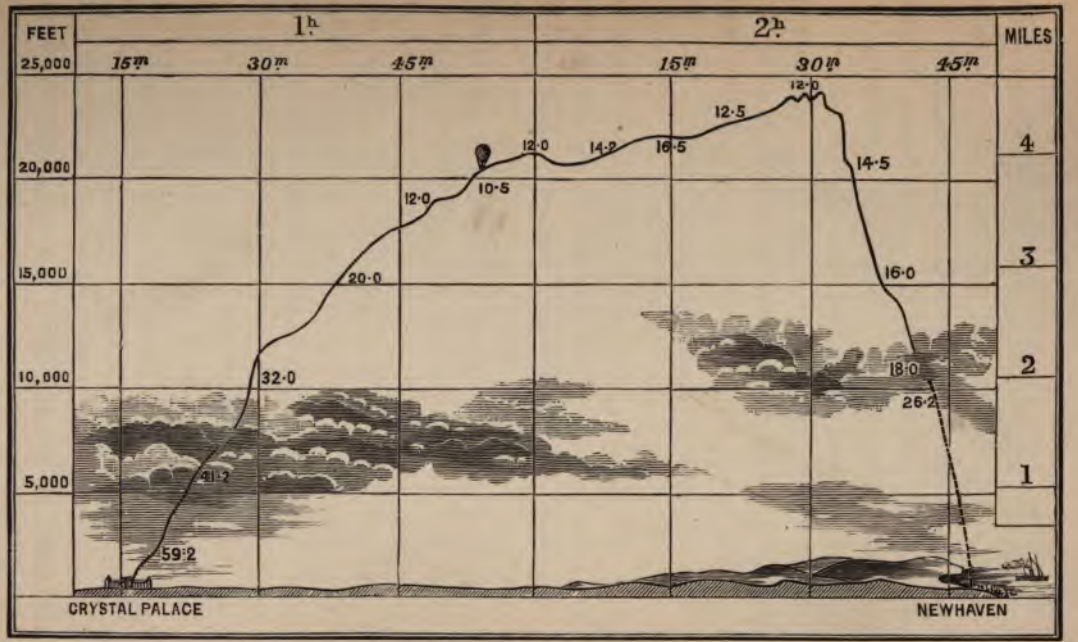
"The temperature before starting was 61°; it decreased to 32° on reaching the clouds, and continued at this point whilst in them; but suddenly fell to 23¼° on leaving the cloud, and was either less or the same at every successive reading till we reached the height of 20,000 feet, where the lowest temperature was recorded. In passing above four miles the temperature increased to 14¼°, and then declined to 12¼° at the highest point, viz., 24,000 feet at one hour and thirteen minutes after starting.

"When we were just four miles high, on descending, we began to reflect that possibly we might have been moving more quickly than we expected, and it was necessary to descend till we could see the earth below. The valve was opened rather freely at 2h. 34m., and we fell a mile in three minutes. We descended quickly, but less rapidly, through the next mile, and reached the clouds at 12,000 feet from the earth, at 2h. 42m. On breaking through them at 2h. 44m., still 10,000 feet from the earth, I was busy with my instruments, when I heard Mr. Coxwell exclaim, 'What's that?' He had caught sight of Beachy Head. *I looked over the car, and the sea seemed to be*

under us. Mr. Coxwell again exclaimed, 'There's not a moment to spare; we must save the land at all risks. Leave the instruments.' Mr. Coxwell almost hung to the valve-line, and told me to do the same, and not to mind it cutting my hand. It was a bold decision, opening the valve in this way, and it was boldly carried out.

"When a mile high, the earth seemed to be coming up to us. There were two rents in the balloon, cut by the valve-line; these we could not heed. Up, up, the earth appeared to come, the fields momentarily enlarging; and we struck the earth at 2h. 48m. at Newhaven, very near the sea—of course with a great crash, but the balloon by the very free use of the valve-line had been crippled and never rose again, or even dragged us from the spot on which we fell. Nearly all the instruments were broken, and to my great regret three very delicate and beautiful thermometers specially sent to me by M. A. L'Abbadie for these observations, were all smashed. I was fortunate, however, in seizing and placing in my pocket the aneroid barometer, which had been up with me in every high ascent. *It was this instrument that Mr. Coxwell had read when we were seven miles high,* and I at the time in a state of insensibility.

"The diagram shows the path of the balloon. From this, it will be seen, that the ascent was gradual from 16,000 feet to the highest point, and there was sufficient time for the instruments to attain the true temperature. We were above four miles for half an hour, not passing above 24,000 feet. On passing below four miles it would seem that the drop to three miles was nearly a straight



DESCENT AT NEWHAVEN. THE BALLOON BECAME A PARACHUTE. [*To face p.* 164.

line, and the next mile, though occupying a little more time, was passed quickly. The position of the clouds was fortunately very high, as is shown on the diagram, which likewise indicates the very rapid descent of two miles in four minutes. The whole time of descending the four miles and a quarter was about a quarter of an hour only. The diagram will speak to the eye more forcibly than language, showing as it does our close proximity to the sea, and the narrow escape from such a dangerous immersion."

UNEXPECTED SCIENTIFIC RESULTS.

REPORT BY MR. GLAISHER.

"In the ascent from Wolverton on June 26th, 1863, as described in my 'Travels in the Air,' the Directors of the North Western Railway Company provided the gas, and gave every facility to members of the Committee of the British Association and their friends to be present. The gasometers at Wolverton were too small to hold gas enough to fill the balloon, it was therefore partly inflated the night before, and remained out all night without being influenced by the slightest wind. The morning of the ascent was also calm, and the sky of a deep blue, implying the presence of but little vapour. The atmosphere was bright and clear, and all the circumstances were of the most promising kind. The hour of ascent was fixed to take place some little time after the arrival of the express train from London, or at a little after noon; and the filling was somewhat delayed, the extraordinary fineness of the morning promising its completion in a short time. Between eleven and twelve all these favourable circumstances changed: the sky became covered with clouds, and

some of them of a stormy character. The win
blew strongly, the balloon lurched a great d
difficulty was experienced in passing the g
balloon, and sufficient could not be passed
o'clock. The wind was momentarily increas
became very desirable to be away. The greate
was experienced in fixing the instruments, and
in great danger of being broken by the violent
the balloon, and the incessant striking of the c
ground, notwithstanding the exertions of fifty
it fast.

"At the time of our departure the spring
jammed so tight by the pressure of the wind t
not act, and we were let free by the simultane
of the men, and had to part instantly with ball
striking adjacent buildings.

"It was three minutes after one when we lef
with a strong W.S.W. wind; the temperatu
four minutes we were 4000 feet high, and ente
with a temperature of 50°, experiencing a n
feeling of cold. As on all previous occasions,
soon to break through the clouds into a floo
sunlight, with a beautiful blue sky, without a
us, and with seas of rocky clouds below.
contrary, when we emerged, it was dark and d
us there were clouds.

"At 9000 feet high we heard the sighing
moaning of the wind as preceding a storm;
first time that I had heard such a sound in th
satisfied ourselves that it was in no way attribut

movement of the cordage about the balloon, but that it was owing to conflicting currents of air beneath. At this time we saw the sun very faintly, and momentarily expected its brilliancy to increase, but instead of this, although we now were two miles high, we entered a fog, and entirely lost sight of the Monarch of the Heavens. Shortly afterwards fine rain fell upon us. Then we entered a dry fog, and at 12,000 feet passed out of it; saw the sun again faintly for a short time, and then entered a wetting fog. At 15,000 feet we were still in fog, but it was not so wetting. At 16,000 feet we entered a dry fog; at 17,000 feet saw faint gleams of the sun, and at the same height we heard a train. We were now about three miles high. As we looked around there were clouds below us, others on our level at a distance, and yet more above. We looked with astonishment at each other, and said that as we were rising steadily we must surely soon pass through them.

"At 17,500 feet we were again enveloped in fog, which became wetting at 18,500 feet. We left this cloud below at 19,600 feet. At 20,000 feet the sun was just visible. We were now approaching four miles high; clouds, dense clouds, were still above us; for a space of 2,000 to 3,000 feet we met with no fog, but on passing above four miles high, our attention was attracted to a dark mass of cloud, and then to another on our level. Both these clouds had fringed edges, and were unmistakably nimbi. Without the slightest doubt they were both rain clouds. Whilst looking at them we again lost sight of everything, being enveloped in fog whilst passing upwards through 1,000 feet. At 22,000 feet we again emerged, and were above clouds

on passing above 23,000 feet. At six minutes heard a railway train; the temperature here w still wished to ascend to find the limits of this v Mr. Coxwell knew better, and I was met with a 'Too short of sand. I cannot go higher; we even stop here.' I was therefore most reluctantly to abandon the wish, and looked searchingly ar this highest point, in close proximity to us, were ra below us, dense fog. I was again reminded tha not stop here. With a hasty glance everywhe below, all around, I saw the sky nearly covered clouds of a stratus character, with cirri still h small spaces of faint blue sky between them; th not the blue of four or five miles high, as I h seen it before, but a faint blue, as seen from when the air is charged with moisture.

"Hastily glancing over the whole scene, the extensive, fine, or picturesque view, as in such s had always before seen. The visible area wa the atmosphere was murky; the clouds were con the aspect everywhere dull.

"I cannot avoid expressing the surprise I h the extraordinary power which a situation like forth, when it is felt that a few moments or devoted to note down all appearances and all circ at these extreme positions; and if not thus rapid they are lost for ever. In such situations every s of the most trivial kind is noticed; the eye become keener, the brain more active, and e increased in power to meet the necessities of

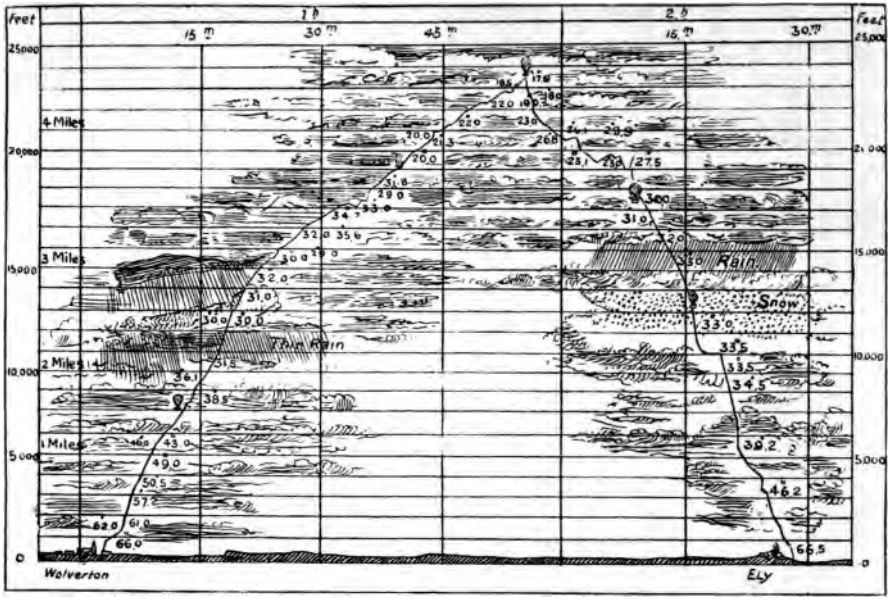
and afterwards, when time has elapsed, it is wonderful how distinctly, at any moment, scenes so witnessed can be recalled and made to reappear mentally in all their details, so vividly, that had I the power of the painter I could reproduce them visibly to the eye upon canvas.

"We then began our downward journey, wondering whether we should meet the same phenomena. Soon we were enveloped in fog, but passed below it when at 22,000 feet, and then we saw the sun faintly. At 20,000 feet we were in a wetting fog, and passed beneath it at 19,500 feet, experiencing great chilliness; fog was then above and below. I now wished to ascend into the fog again to check the accuracy of my readings as to its temperature, and the reality of the chill we had felt. This we did; the temperature rose to its previous reading, and fell again on descending.

"For the next 1000 feet we passed down through a thick atmosphere, but not in cloud or fog. At the height of 18,000 feet we were again in fog. At three miles high we were still in fog, and on passing just below three miles rain fell pattering on the balloon. This was one mile higher than we experienced rain on the ascent, but it was much heavier. On passing below 14,000 feet, and for a space of nearly 5000 we passed through a beautiful snowy scene. There were no flakes in the air—the snow was entirely composed of spiculæ of ice, of cross spiculæ at angles of 60°, and an innumerable number of snow crystals, small in size, but distinct and of well-known forms, easily recognizable as they fell and remained on the coat. This unexpected meeting with snow on a summer afternoon was

all that was needed on this occasion to complete the experience of the characteristics of extreme heat of summer with the cold of winter within the range of a few hours. On passing below the snow, which we did when about 10,000 feet from the earth, we entered a murky atmosphere, which continued till we reached the ground; indeed, so thick and misty was the lower atmosphere, that although we passed nearly over Ely Cathedral we were unable to see it. When 5000 feet high, we were without sand, and simply became a falling body, rapidity being checked by throwing the lower part of the balloon into the shape of a parachute. The place of descent was in a field on the borders of the counties of Cambridge and Norfolk, twenty miles from the mouth of the Wash, and eight miles from Ely.

"This Wolverton ascent must rank among the most extraordinary of my series, giving scientific data of great interest and results most unexpected. The leading features will most readily be seen by looking at the diagram, on which the black line shows the path of the balloon, and the figures near to it the temperature of the air, which will be observed to decrease from 65° to 18° at the highest point, and to increase to 66° again on descending to the earth. By following the path clouds will be seen to be reached at 4000 feet, and above this an attempt has been made to show to the eye at a glance the varying strata and their situations through which we passed. The bent arrows in the ascending track are placed where we heard the moaning of the wind. The faint shading just above is where we saw the sun, and momentarily expected to come within its



ASCENT FROM WOLVERTON. PATH OF THE BALLOON. [*To face p.* 170.

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influence. The rain which fell at 10,000 feet, the partially clear spaces and those of more or less dense fog in the ascent to the highest point, and the appearance of the sky there, are clearly seen in the diagram, as well as the place of re-ascension in the downward journey to which I have referred. The clear spaces are those where we were out of fog at 14,000 feet. At a lower level will be seen the snowstorm of 5000 feet in thickness, and below that the thick and misty atmosphere till the earth was reached."

CHAPTER IX.

COASTING IN A BALLOON.

Letter from Mr. Hatton Turnor to the Editor of *The Times*.

"ON a former occasion you did me the honour to insert an account of a balloon trip till then the most rapid on record; and I now hope that you may again find room in the valuable space of your journal for an account of a trip made yesterday by Mr. Glaisher and Mr. Coxwell, in which, by their kind permission, another gentleman and myself were allowed to join.

"Having previously obtained the knowledge, from observation of the clouds and a paper-pilot, that the lower current was flowing almost due west, while the upper was from north to south, we rose quietly from the Crystal Palace at 4.46 p.m.

"Mr. Glaisher, with a variety of instruments surrounding him, commenced at once his observations, which I hope may be published. The lower current carried us towards London, and we almost hoped to back Eton with our cheers, but unfortunately we reached the upper current, and were carried slowly past Croydon, where we observed tents, and a large concourse. We passed immediately over a beautiful park near Epsom, which Mr. Glaisher photographed. We crossed the South-Eastern Railway,

between Buckland and Reigate town. Here the rail, following the curves of the chalk-hills and Bletchworth, drew attention. Between this and Horsham we attained our greatest elevation, not much over a mile, as we wished to go distance, not height, hoping to cross the Channel; but the sluggishness of the atmosphere disappointed us. After once enjoying the pleasures of seeing the fields contracting, we allowed them to expand, and remained at a lower altitude. Passing immediately over Horsham, Mr. Glaisher took another photograph. We saw the sea, and from the inlet perceived that we were going straight for New Shoreham.

"'The sea looks tempting,' we all exclaimed; but, alas! it was seven o'clock, and our pace not rapid, so this must be postponed.

"Mr. Coxwell drops us into the lower current, and we coast about five miles from the shore, at not more than 1500 feet, and sometimes only 600 feet from the ground. Nothing could be more enjoyable. Villagers shouting to us to come down, and occasionally answering our questions; the cheery cries of children; sheep flocking on the downs, not knowing which way to go; geese cackling and scuttling off to the farms, other birds remaining in trees; while a pack of hounds was in the wildest excitement within their kennels, trying to get out. We passed immediately over the parks of Arundel and Dale, hearing the pheasants crowing as they went to roost.

"Mr. Coxwell thought at this time of crossing the Solent, and landing in the Isle of Wight; but the

wind getting a little more southerly, and knowing the inconvenience of the country near Portsmouth for landing when dark, we took advantage of an open piece of grass near the house at Goodwood, and descended soon after 8 p.m.

"Mr. Coxwell, after throwing a rope to a cricketer, landed us so gently that we could not have crushed a daisy. We were afterwards drawn by a rope to the front of the house, for the benefit of a few gazers. I had hoped that Mr. Coxwell would here tether his balloon and continue our journey next day; but it was Sunday, and so he resolved to pack it up; otherwise, the upper current being again north, our wishes might this day have been happily accomplished.

"Our thanks are due to Captain Valentine, and other good people there assembled, for the assistance they gave us in packing up.

"Chichester, *July* 12*th*, 1863."

MORE INFORMATION ABOUT RAIN OBTAINED.

REPORT BY MR. GLAISHER.

"The weather on July 21st, 1863, was bad, the sky overcast and rainy. Although in every respect a thoroughly bad day, it was well suited to a particular purpose I had in view, viz., to investigate, if possible, some points concerning the formation of rain in the clouds themselves; to determine why a much larger amount of rain is collected in a gauge near the surface of the earth than in one placed at an elevation in the same locality, and whether during rain the air is saturated completely; or, if not, to what extent; also to discover the regulating

causes of a rainfall, which sometimes occurs in large drops, at others in minute particles.

"So long back as the years 1842 and 1843 I made many experiments in order to ascertain why so great a difference in volume was found to exist in the water collected at lower stations as compared with that collected at higher.

"The experiments which yielded the best results were those in relation to temperature.

"I always found that when the rain was warm, with respect to the temperature of the air at the time, no difference existed in the quantities of rain collected at different heights; but when the temperature of the rain was lower than the temperature of the air, a considerable difference existed.

"From this circumstance it would appear probable that the difference in the quantities of rain collected at different heights is owing (at least in part) to the great condensation of the vapour in the lower atmosphere, through being in contact with the relatively cold rain.

"In this ascent I desired to confirm or otherwise Mr. Green's deductions.

"This gentleman, believing that whenever a fall of rain happens from an overcast sky, there will invariably be found to exist another stratum of cloud at a certain elevation above the first; I determined, if I found it so, to measure the space between them and the thickness of the upper stratum, and to ascertain whether the sun was shining on its upper surface.

"We left the earth at 4h. 52m., and in ten seconds had

ascended into the mist; in twenty seconds, to a level with the clouds, but not through them. At the height of 1,200 feet, we passed out of this rain.

"At the height of 2,800 feet we emerged from clouds, and saw a stratum of darker cloud above; we then descended to 800 feet, over the West India Docks, and saw rain falling heavily upon the earth. None fell upon the balloon; that which we saw, therefore, had its origin within 800 feet of the ground.

"We ascended again, and this time passed upwards through fog, 1,400 feet in thickness.

"At 3,300 feet we were again out of cloud, and once more saw the dark stratum at a distance above; clouds obscured the earth below.

"On descending, at 2,700 feet we entered a dry fog, but it became wetting 100 feet lower down. After passing through 600 feet of it, the clouds became more and more wetting, and below were intensely black.

"At 5h. 28m., we were about 700 feet high, or about 500 feet above Epping Forest, and heard the noise of the rain pattering upon the trees.

"Again we ascended to 2,000 feet; then through squalls of rain and wind descended to 200 feet, the rain-drops being as large as a fourpenny piece, the same as when we left the earth.

"On reaching the earth, we found that rain had been falling heavily all the time we were in the air.

"Thus this journey gave more information about rain than we ever before had gained, and which could be obtained by means of the balloon alone."

BALLOON SURVEY OF PORTSMOUTH AND THE ISLE OF WIGHT.

My recent aërial reconnaissance at Aldershot having been witnessed by Mr. Brown, the proprieter of the Portsmouth Recreation Grounds, an application was made to me by that gentleman with the view of ascertaining whether I would attempt any experiment of a similar character at this famous seaport. When I had explained the nature of my engagement at Aldershot, and that it was in compliance with Government orders, Mr. Brown decided to have a public ascent. I agreed to make it on one or two conditions: —firstly, that it should take place if the wind was fair for the Isle of Wight, secondly, that I would offer no objection if I could even skirt the coast or proceed somewhat inland.

As it was doubtful whether my balloon, the "Evening Star," could be filled, I borrowed a small one from Mr. Youens, and it was well filled by the appointed hour—7 o'clock, the wind at that time being fresh from the westward, which occasioned much doubt as to whether I would make the ascent or not.

Relying upon the careful observations I had previously made with chart, compass and pilot balloons, and allowing for local variations, I left the North-end Gardens at 7.15, with full confidence as to my probable course. The scene which opened out in the space of five minutes, was altogether novel. Instead of the widespread landscape so familiar to aërial voyagers, with its variegated surface of green and brown fields, I now had a commanding view of a beautiful island and of a town and harbour so surrounded

by water, with the Channel beyond, that, had it not been for the reliance I had in the direction of the wind, I should have fancied that I was likely to be blown away due south, and to drift out to sea. Although I was provided with an excellent barometer and thermometer, presented to me by Mr. Glaisher, I had very little opportunity of using them frequently, and I felt how valuable Mr. Glaisher's presence would have been in the car.

What most engaged my own attention was a general survey of the town, fortifications, and shipping, from a military point of view. I was agreeably surprised to find the atmosphere being clear, how well I could perceive and count the cannon mounted on the ramparts; the ships could easily be distinguished, and there was no difficulty in finding from port-holes, their relative sizes, whether corvettes, frigates, or line-of-battle ships. The bold and leading features of Portsmouth as a naval and military stronghold, might have been canvassed in an interesting manner, had I had companions, instead of being alone.

I very soon satisfied myself most thoroughly as to the extent of objects visible to the naked eye and to an ordinary vision assisted by a common opera glass. At 7.35, barometer 26.6, thermometer 46., I saw through a glass the visitors on Ryde pier promenading. The distance could not have been less than seven or eight miles. I observed, also, marines or soldiers of the line in front of a guard-house, and several steamers between Gosport and Southsea Castle. Being soon over the water, I had to withdraw my

attention and look ahead, as a more southerly breeze began to alter my course.

As the shades of evening came, I found I was making for several extensive woods on high ground between Singleton and Arundel. As I crossed the first wood, a large meteor shot over the balloon from an easterly direction, another quickly following; and although I relied upon their supposed altitude, and felt personal security, yet I could not but compare my situation to that of a ship which receives a shot or two across her bows, or perhaps a 24lb. rocket, as a warning to heave-to or alter her course in obedience to the dictates of an enemy.

The late hour of the night, and the high ground upon which Nore Wood is situated, compelled me to cast anchor among several tall beech trees. Indeed, I had to let off gas and leave the balloon suspended all night before I secured and packed it up. At daylight, several gentlemen volunteered to assist me, and we proceeded at 5 o'clock to the place of descent with ropes, ladders and hatchets, ready to lop off boughs or fell a tree, if necessary, rather than injure the balloon.

I was obliged to return to *terra firma* down a tree at least sixty feet from the ground. In the morning, the balloon had quietly slid down through the boughs, and was not in any way damaged.

The magnificent and complete bird's-eye view I had of the Isle of Wight, would occupy too much space and time to describe. My voyage on August 11th, 1863, was most exciting and in many respects peculiar, differing, as it did, from previous trips.

EXCHANGE OF NATIONAL COURTESIES, ON OCTOBER 9th, 1863.

ACCOUNT BY MR. GLAISHER.

"The place, from which we ascended was the Crystal Palace. There were in the car besides Mr. Coxwell and myself, the Hon. Robert J. Walker, M.A., Councillor at Law in the Supreme Court of the United States, and late Secretary of the Treasury, Governor of Kansas, &c., also Pliny Miles, Esq. from America, and Mr. Rowe, together with Count Schaffgotsch, who came over to see Mr. Coxwell, having ascended with him previously in Germany.

"The healths of our respective sovereigns were given, viz., our Queen, the Emperor of Austria, and the President of the United States.

"Then the Hon. Mr. Walker gave the toast, 'May England and America be always at peace.' These toasts were celebrated when we were 7,000 feet high, and directly over London Bridge.

"The scene around was probably one that cannot be equalled in the world with one glance—the homes of 3,000,000 of people were seen, and so distinctly, that every large building at every part was easily distinguished, while those almost under us, viz., the Bank and Newgate, the docks, and surrounding buildings, &c., in such detail that their inner courts were visible, so that their ground plans could have been drawn. Cannon Street, leading to St. Paul's, was easily traced; it was difficult to believe at first, that that small building was St. Paul's. Looking onwards, Oxford Street was visible, the Parks, the Houses of Parliament, and Millbank Prison, with its radiating lines from the centre, at once attracted notice. In fact, the

whole of London was visible, and some parts of it very clearly so. Then all around there were lines of detached villas, imbedded, as it were, in abundance of shrubs, and beyond, the country, like a garden, with its fields well marked, becoming smaller and smaller as the eye wandered further and further away.

"Again, looking down, there was the Thames, without the slightest mist, with all its winding course throughout its whole length, with innumerable ships apparently very long and narrow, and steam-boats like moving toys; Gravesend was visible, as were the mouth of the Thames and the coast leading on to Norfolk. The southern boundary of the mouth of the Thames was not quite so clear, but the sea beyond was seen for many miles; and when higher up I looked for the coast of France, but I could not see it. On withdrawing the eye, it was arrested by the garden-like appearance of the county of Kent, till again London claimed yet more general attention; smoke thin and blue, was curling above it and slowly moving away in beautiful curves, from all but that part south of the Thames, here the smoke was less blue and became apparently more dense; the cause was soon evident, for it was plain that it was mixed with mist rising from the ground, the southern limits of which were bounded by an even line, doubtless indicating the meeting of the subsoils of gravel and clay.

"The whole of the scene was surmounted by a canopy of blue, the sky being quite clear and free from cloud everywhere, excepting near the horizon, where a circular band of cumuli and strata clouds, extending all round, formed a fitting boundary for such a scene. The sun was seen

setting, but was not itself visible, except a small part, which seen through a break in a dark stratus cloud, looked like an eye over-seeing all.

"The sunset, as seen from the earth, was described as fine, the air being clear and shadows sharply defined; but as we rose, the golden hues decreased in intensity, and at this time ejaculations escaped from all the occupants of the car.

"Both Mr. Walker and Mr. Miles have seen the sunsets of the far west, and they expressed themselves as never having witnessed anything so rich and picturesque. The richness of these colours decreased in intensity both right and left of the place of the sun, but their effects extended to fully one-fourth part of the circle, where rose-colour clouds limited the scene. The remainder of the circle was completed by pure white cumulus clouds of very rounded and symmetrical forms.

"I have seen London from above by night, and I have seen it by day when four miles high, but nothing could exceed the view on this occasion at the height of one mile, varying to one mile and three quarters, with a clear atmosphere. The roar of London, even at the greatest height, was one unceasing rich and deep sound, and added interest to the general circumstances in which we were placed. My attention was of necessity constantly required at the instruments, and my notes upon general views were very hastily made, the descriptions being, therefore, necessarily imperfect, but Mr. Miles took notes on this occasion, and I hope the public may have the benefit of them.

"I have received several communications from gentlemen

who saw the balloon from Hyde Park, Oxford Street, and Deptford, in fact at points separated from each other by several miles, stating that the balloon was in their respective zeniths, indicating how few persons really looked directly overhead, and also how little confidence can be placed in estimated observations, particularly those made near the zenith.

"After six o'clock I watched the increasing blackness over the earth, the lighting-up of the villages and towns, the vanishing of the boundaries of fields, the distinct visibility of the first star, and circumstances generally, till on nearing the earth Mr. Coxwell provided me, as No. 1, with a bag of sand to discharge when number one should be called out, the Count Schaffgotsch with number two, and Mr. Miles with number three. On nearing the earth number one obeyed by emptying his bag, and we touched the earth on one side of a high thorn hedge. "No more sand, we shall rise nicely," and rise we did, hopped over the hedge into the next field, and slid along till the grapnel caught in the hedge we had just passed over, and our journey was ended. Vivid lightning almost immediately played, at first startling Mr. Coxwell, who exclaimed, 'What's that!' fearing the vicinity of a light near the gas escaping from the balloon.

"Our place of descent was Pinton Grange, on the boundaries of the counties of Hertfordshire and Bedfordshire, at the farm of Mr. Joseph Lake, who was present.

"There, and in fact always far from London, we met with much willing assistance, but near the metropolis little aid is given willingly, and the descent of the balloon

is made a pretext for as much extortion as Mr. Coxwell will put up with. This was the case on this occasion, when two guineas were required for carrying the balloon four or five miles; what was paid I know not. One exception I must make to this, in the case of Mr. James King, who kindly drove me and the Hon. Mr. Walker from Pinton to Hitchin, for which our thanks are due."

A BALLOON SURVEY OF THE BRITISH ARMY, 1863.

Valuable papers on this subject by Lieutenant G. Grover, R.E., and by Captain F. Beaumont, R.E., were read at Chatham in the year 1862, and are fully recorded in "Astra Castra,"

Captain Beaumont observed in 1863, "Since writing the above mentioned papers, an experiment had been carried out under the direction of the Ordnance Select Committee, an account of which is subjoined.

"On the question being brought before the Committee, the points they wished to establish were, first, that the fact of being able to overlook a tract of country from a great elevation really conveyed the advantage it was represented to do, and secondly, that there was nothing in the abstract situation which made it impracticable to reconnoitre from the car of a balloon.

"With this object only in view, an ordinary balloon inflated with coal gas would suffice; for, though unfitted for the purposes of a reconnaissance, still by choosing a calm day it could be employed. Arrangements were therefore made for the use of one of Mr. Coxwell's balloons, the necessary guy-ropes, gas, &c., being provided by Government. Aldershot was the place appointed for

the ascent, as the gas-works happened to be conveniently situated, and, being a camp, there would be no difficulty in obtaining the concurrence of the military.

"The Authorities at the Horse Guards sent down orders to Aldershot, that on a suitable day for the ascent the troops should be marched out in different directions, so that the value of the balloon as a point of observation, could be practically determined.

"The first day appointed proved too boisterous, and the experiment was put off till the 13th July, 1863.

"A field day, however, for the Prince of Wales being fixed for the day after, the ascent took place on Tuesday the 14th. This so far modified the experiment, that no observations could be made on troops at the extreme distance at which it was anticipated they would be visible from the balloon.

"The inflation was completed before eight o'clock in the morning, as the ropes and men being new to their tasks it was considered advisable that a few preliminary ascents should be made. The balloon was carried to Thorn-hill, some 300 yards from the gasworks, where the ascents were made.

"Three guy-ropes were used, one of which, stronger than the other two, was passed through a snatch-block fixed to the ground. The ropes were manned by a party of engineers entirely new to the work. No difficulty was experienced in either raising or lowering the balloon, the latter operation being done in about fifteen minutes from the height of 1000 feet, the balloon remaining for upwards of an hour-and-a-half hovering over the camp. It was

raised and lowered at pleasure to enable the observers to be changed, and made some eight or ten ascents before it finally left the ground *for its free flight.*

"As to the practical results obtained, the experiment afforded no criterion of the difficulty, or otherwise, of inflation on active service, where the gasometers would have to be carried, or, of the amount of stability a captive balloon might be capable of attaining. It was shown, however, that the transport of a balloon when filled was simple, and that it could be easily raised or lowered. A tract of country altogether unseen from the ground below was brought under observation, and the movements of troops on the top of Cæsar's Camp, *otherwise out of sight,* were clearly discernible. From the top of Thorn-hill, the range of hills known as the Hog Edge, of which Cæsar's Camp is a part or adjunct, bounded the horizon on that side at a distance of somewhat less than two miles. From the elevation of 1000 feet such a boundary no longer existed, the slopes of the opposite sides of the hills even being visible; in fact, an effective horizon of twenty miles diameter was obtained—that is, no large movement of troops could take place within a radius of ten miles without being seen.

"The day of the ascent was very still, exceptionally so, and how far it may be possible to overcome the difficulties which arise when the air is in motion, can only be determined by experiment.

"My own idea, however, is, that with a properly constructed apparatus, balloon reconnaissances may be made in a wind moving at any rate up to twenty miles per hour.

"The higher the wind, the less would, of course, be the altitude attained; however, a height of even 200 feet is more than the spires of most churches—points of observation eagerly sought for when on the march in an enemy's country.

"It would appear, therefore, that, under certain circumstances, the balloon affords means to an army of carrying with it a lofty point of observation; and, so far as this experiment went, it bears out the opinion I expressed on the matter in the paper to which this is an addendum.

"With reference to the general subject of ballooning, I believe that some useful results might be obtained by photography applied from the balloon, and I hope, should an experimental reconnoitring apparatus be got up, to be able to make some experiments in the matter."

THE FIRST PHOTOGRAPHIC TRIP IN ENGLAND.

In the year 1863 the late Mr. Henry Negretti had the special use of my large balloon to initiate experiments in this branch of his art, and although superior pictures have been taken since in France by M. Tissandier, and in England by Mr. Shadbolt, still the early experience of the enterprising photographer contains points of interest which ought to be mentioned in these pages.

The following is Mr. Negretti's own account:—

"All the usual arrangements having been made, the car was fitted up as a dark room (as I had resolved upon employing the wet collodion process) the cameras were fixed; a plate had been prepared by my assistant, Mr. Collings; and about twelve o'clock we started from the

gasworks at Bell Green, Lower Sydenham, and proceeded in a south-easterly direction. We rose rapidly from the ground so as to clear the chimneys of the gasworks, and this swift ascent caused the balloon to revolve so quickly at first that it would have been useless to have exposed the plate that we had prepared. This rotatory motion of the balloon continued more or less throughout the entire journey, and it constitutes, indeed, the most serious obstacle with which the photographer has to contend. In about a quarter-of-an-hour, and at an altitude of nearly 4000 feet, as registered by a small pocket barometer, the car became much more stationary, and accordingly I now determined upon attempting a picture. The exposure was almost instantaneous, but the brief period that elapsed between pouring on the developing solution and the appearance of the image was to me one of the most anxious suspense: the problem of the actinic or non-actinic properties of light at such an altitude was to be solved; and it was with some pardonable degree of exultation that I heard my assistant say, 'the picture has moved,' which for the information of the non-photographer means that there was a picture but not a good one, owing to some movement either in the subject to be photographed or in the apparatus. On hearing the above exclamation I was greatly relieved, and said, 'all right, prepare another.' I now felt that fully one half of my most sanguine expectations were realised, *and that I had established the important fact that photography is possible at such a distance from the earth,* and that its success depends almost entirely upon the rapidity with which the sensitive

plate can be exposed. One plate after another, and still 'moved, moved.' This seemed to me inexplicable, for the exposure was as instantaneous as could possibly be effected.

"On my sitting down to reflect upon the cause of this moving Mr. Coxwell kindly offered to descend from his usual place in the ring and assist me if I wanted any help. Meanwhile we had penetrated into a cloud, but I was not fortunate enough to meet with any of those glorious visions which have been so ably described by some of your correspondents. I regretted this all the more because that slight movement which would be fatal to a terrestrial landscape would not have been so apparent in a photographic picture of the sky. On emerging from this cloud the objects beneath us were much clearer than before, and the balloon, although still travelling at the rate of about fifteen miles an hour, was much steadier in its motion, rotating only once in some two minutes.

"More plates were now exposed in rapid succession from both sides of the car with much better results, but still leaving *quelque chose à desirer*. Some heavy firing was heard and pronounced by Mr. Coxwell to be from Woolwich, at a distance of some eight or ten miles; at every report the car shook perceptibly—so much so that any attempt at obtaining pictures at that time would have been quite useless. One circumstance I noticed, which I think deserves mention. I had focussed a lovely park and mansion, when to my chagrin I saw the picture leave the ground glass. I wished to see it again, and took hold of one of the ropes that suspends the car to the balloon, and

by successive 'pullings' succeeded in jerking the view back again, but of course by so doing I had imparted a movement to the balloon which prevented me doing anything further for some time to come. The main object of what was essentially an experimental trip had been obtained, and it had been demonstrated that photographic views can be taken at elevations ranging from 3000 to 6000 feet from the ground. Some alteration of details in the arrangement of cameras and shutters will be needed previous to another trip, and I may throw out a hint for the benefit of my professional *confrères* and amateurs, that I believe a circular form of car will probably tend to check that rotatory motion which is so much against us. One thing seems clear to me, that the lenses must be uncovered without any exertion or movement on the part of the photographer; an apparatus for this purpose independent of the camera would, I think, be best. Perfect immobility on the part of the occupants of the car would tend to getting good sharp pictures. I shall assuredly continue my experiments, and on the good old Italian motto '*chi dura vince*,' I am confident that perseverance will result in still greater success.

"Feeling perfectly satisfied with the results of my preliminary experiments I now determined on descending. The balloon was passing over the valley of the Medway, and the very beautiful landscape reminded me forcibly of that part of Lombardy called the Brianza, as seen from the mountain tops at the side of my native city of Como; the hop gardens, also, almost vied with the vineyards of that district, but as we drew near the sharp-pointed poles

the prospect became decidedly less pleasant. Thanks, however, to Mr. Coxwell we descended in perfect safety at Barnjut, about two miles from Maidstone, on the property of Mr. Whitehead, whose only answer to our apologies for having so unceremoniously descended in one of his farmyards was a hearty English welcome, offering us conveyance to the railway, and expressing his regret that we did not alight in the park, near his mansion, where we should have been more comfortable."

CHAPTER X.

MEETING OF THE BRITISH ASSOCIATION, AT NEWCASTLE IN 1863.

THE TIMES of September 2nd, said that, "the section-room devoted to the discussion of questions relating to mathematical and physical science, was densely crowded to hear Mr. Glaisher relate the result of his meteorological experiments at varied elevations in Mr. Coxwell's balloon.

"Colonel Sykes introduced the subject by reading the report of the Balloon Committee appointed by the Association at Cambridge in 1862, after which, Mr. Glaisher proceeded to read his paper.

"Then after explaining the various readings of the dry and wet bulb thermometers, Mr. Glaisher adverted to the question of the heights and appearances of clouds and the marked contrast between the conditions of the aërial regions in the summer of 1863, compared with that of the previous year.

"After a short explanation of the velocity of the winds, he went on to speak of the curious changes in colour that he and Mr. Coxwell experienced in ascending, and remarked that they could now easily go a mile higher without turning quite so blue as before. In one descent, they very

nearly got into the sea, and only escaped that fate by coming down at the rate of four miles in fifteen minutes. The results of all the ascents, he considered, formed a bright chapter—perhaps the brighest—in the history of the Association, and, the balloon having done so much for science, he hoped science would do something for the balloon.

"Professor Owen said he had attended this meeting of the section, chiefly in the hope of hearing from Mr. Glaisher something of the influences of these very high distances on the human frame, which was adapted, of course, to a very different medium. The fact which Mr. Glaisher mentioned as to his feeling a greater power of resisting the influences of these very high temperatures was very interesting in physiology, and in relation to the series of facts with which they were acquainted. They knew their lungs did adapt themselves to atmospheres of different degrees of gravity, so that there were people who lived habitually on high mountains, and felt no difficulty in breathing, such as was felt at once when the inhabitants of a plain or low country came up to those elevations.

"Now, that depended upon the greater proportion of the minute cells of the lungs which are open and receive an attenuated atmosphere, in proportion to the minute cells that are occupied by a quantity of mucus. Those on the plain did not make so large a use of their breathing apparatus, as those who lived at great altitudes. Hence, more cells, occupied by mucus, would be taken up, and opened to free course and play; and he had no doubt that

was the solution of the interesting fact mentioned by Mr. Glaisher.

"Physiologists were all agreed that one condition of longevity was the capacity of the chest, and, therefore, he hoped the increased breathing capacity acquired by Messrs. Glaisher and Coxwell, would tend to the prolongation of their lives.

"In the evening Mr. Glaisher and Mr. Coxwell made an ascent from the Cricket Ground.

"The lecture that followed in the Town Hall on the following evening by Mr. Glaisher, was attended by 3,000 persons. The chairman, at its conclusion, rose and called upon the large audience to express by acclamation, their thanks to Mr. Glaisher for the interesting lecture he had delivered. He had had opportunities beyond all other men, of making scientific observations in the higher regions of the atmosphere, and he (the chairman) perceived from the attention they had given to his lecture, how much they had been interested by the important facts which he had communicated to them, and he was sure they not only thanked Mr. Glaisher, but wished him every success in his future explorations. (Loud applause.)

"A general call was then made for Mr. Coxwell, who rose amidst the warmest acclamations, and expressed the pleasure and gratitude he felt for the very handsome and kind manner in which every mention of his name had been received. To Mr. Glaisher it was that science was indebted for the advances made in meteorology, and this gentleman, though he avoided speaking of the risks he encountered, and gave only the bright side of the picture, still most

bravely, and without hesitation, encountered many dangers for the sake of advancing that branch of science to which he was devoted, and the British Association could not have selected a man of greater ability and determination, or one more certain to do justice to the high mission with which the Association had entrusted him. He briefly referred to the late accident which had given him the greatest pain, as he fully believed he was trusting his balloon to one who could manage it, and such a sad result could not be otherwise than painful although no blame might attach to any one but the unfortunate victim. He would return, however, to the brighter subject of Mr. Glaisher's accomplishments and successes. Whatever might be the results of the forthcoming experiments in France, and he (Mr. Coxwell) wished them every success, he was glad his able coadjutor was an Englishman, and to feel the conviction that his fame for these researches would long remain unequalled." (Loud applause.)

MR. GLAISHER ON THE DECLINE OF TEMPERATURE.

"On ascending with a cloudy sky, the temperature usually declines till the clouds are reached, but, on breaking through them, there is always an increase of several degrees of temperature; and, after this, the decline of temperature usually continues, and would do so continuously if there were no disturbing causes in operation. On ascending with a clear sky, we start with a higher temperature than with a cloudy one, as much higher as the loss of heat caused by the clouds, an approximate measure of which is that sudden increase of temperature in passing

from cloud to a clear sky. In no instance have I met with the atmosphere in a normal state in respect to temperature, at different elevations—even up to four or five miles warm currents of air have been met with. By warm I mean that their temperatures were higher than in the strata immediately beneath. These warm strata are variable in thickness, from 1,000 feet to 10,000 feet, and varying from 1 deg. to 20 deg. in excess. It is necessary, in considering the law of the decrease of temperature, to take into account the state of the sky, and to separate the experiments made in one state from those in the other. Collecting the results in the cloudy state, we have first, that the decline of temperature,

When the sky was cloudy—

	Deg.		Ft.		Deg.						Ft.
"From	0	to	1,000	was	4·7	from	7	experiments,	or	1°	in 213
,,	1,000	,,	2,000	,,	4·2	,,	7	,,	,,		239
,,	2,000	,,	3,000	,,	4·1	,,	10	,,	,,		244
,,	3,000	,,	4,000	,,	3·7	,,	10	,,	,,		271
,,	4,000	,,	5,000	,,	3·1	,,	6	,,	,,		323

When the sky was partially clear—

	Deg.		Ft.		Deg.						Ft.
"From	0	to	1,000	was	7·2	from	5	experiments,	or	1°	in 139
,,	0	,,	2,000	,,	5·3	,,	5	,,	,,		189
,,	0	,,	3,000	,,	4·6	,,	5	,,	,,		254
,,	0	,,	4,000	,,	3·4	,,	6	,,	,,		295
,,	0	,,	5,000	,,	2·7	,,	7	,,	,,		370

"These results do not at all confirm the theory of a decline of one degree of temperature for every increase of 300 feet.

"We will now consider the decrease at heights above

the cloud-plane. The decrease of the temperature of the air at heights exceeding 5,000 feet is as follows :—

	Ft.		Ft.		Deg.					Ft.
"From	5,000	to	6,000	was	2·8	from	10	experiments, or	1°	in 357
,,	6,000	,,	7,000	,,	2·8	,,	8	,,	,,	357
,,	7,000	,,	8,000	,,	2·7	,,	8	,,	,,	370
,,	8,000	,,	9,000	,,	2·6	,,	8	,,	,,	384
,,	9,000	,,	10,000	,,	2·6	,,	8	,,	,,	384
,,	10,000	,,	11,000	,,	2·6	,,	8	,,	,,	384
,,	11,000	,,	12,000	,,	2·6	,,	6	,,	,,	384
,,	12,000	,,	13,000	,,	2·5	,,	6	,,	,,	400
,,	13,000	,,	14,000	,,	2·2	,,	6	,,	,,	455
,,	14,000	,,	15,000	,,	2·1	,,	9	,,	,,	477
,,	15,000	,,	16,000	,,	2·1	,,	9	,,	,,	477
,,	16,000	,,	17,000	,,	1·9	,,	9	,,	,,	527
,,	17,000	,,	18,000	,,	1·8	,,	9	,,	,,	556
,,	18,000	,,	19,000	,,	1·8	,,	9	,,	,,	556
,,	19,000	,,	20,000	,,	1·5	,,	9	,,	,,	667
,,	20,000	,,	21,000	,,	1·3	,,	9	,,	,,	771
,,	21,000	,,	22,000	,,	1·3	,,	9	,,	,,	771
,,	22,000	,,	23,000	,,	1·0	,,	9	,,	,,	1,000
,,	23,000	,,	24,000	,,	1·3	,,	2	,,	,,	771
,,	24,000	,,	25,000	,,	1·1	,,	2	,,	,,	909
,,	25,000	,,	26,000	,,	1·0	,,	1	,,	,,	1,000
,,	26,000	,,	27,000	,,	1·0	,,	1	,,	,,	1,000
,,	27,000	,,	28,000	,,	0·9	,,	1	,,	,,	1,012
,,	28,000	,,	29,000	,,	0·8	,,	1	,,	,,	1,050

"These results follow almost in sequence with those found with the partially clear sky, and together show that a change of temperature of one degree takes place in 139 feet near the earth, and that it requires fully 1,000 feet for a change of one degree at the height of 30,000 feet.

"By adding successively together the decrease due to each 1,000 feet, we have the whole decrease of temperature from the earth to the different elevations.

	Ft.		Ft.		Deg.			Ft.
'From	0	to	1,000	the decrease was	7·2	or 1° on the	average of	139
,,	,,		2,000	,,	12·5	,,		160
,,	,,		3,000	,,	17·1	,,		176
,,	,,		4,000	,,	20·5	,,		195
,,	,,		5,000	,,	23·2	,,		211
,,	,,		6,000	,,	26·0	,,		230
,,	,,		7,000	,,	28·8	,,		243
,,	,,		8,000	,,	31·5	,,		254
,,	,,		9,000	,,	34·1	,,		263
,,	,,		10,000	,,	36·7	,,		272
,,	,,		11,000	,,	39·3	,,		279
,,	,,		12,000	,,	41·9	,,		286
,,	,,		13,000	,,	44·4	,,		293
,,	,,		14,000	,,	46·6	,,		300
,,	,,		15,000	,,	48·7	,,		308
,,	,,		16,000	,,	50·8	,,		314
,,	,,		17,000	,,	52·7	,,		322
,,	,,		18,000	,,	54·5	,,		330
,,	,,		19,000	,,	56·3	,,		337
,,	,,		20,000	,,	57·8	,,		346
,,	,,		21,000	,,	59·1	,,		355
,,	,,		22,000	,,	61·4	,,		358
,,	,,		23,000	,,	62·4	,,		368
,,	,,		24,000	,,	63·7	,,		377
,,	,,		25,000	,,	64·8	,,		386
,,	,,		26,000	,,	65·8	,,		396
,,	,,		27,000	,,	66·8	,,		404
,,	,,		28,000	,,	67·7	,,		413
,,	,,		29,000	,,	68·5	,,		423
,,	,,		30,000	,,	70·0	,,		428

"The following barometer readings for different heights will be interesting:—

"At the height of	1	mile	the barometer reading is	24·7	inches.
,,	2	miles	,, ,,	20·3	,,
,,	3	,,	,, ,,	16·7	,,
,,	4	,,	,, ,,	13·7	,,
,,	5	,,	,, ,,	11·3	,,
,,	10	,,	,, ,,	4·2	,,
,,	15	,,	,, ,,	1·6	,,
,,	20	,,	,, ,,	1·0	less."

BALLOON ASCENT FROM THE CRICKET GROUND NEWCASTLE.

As reported by a Local Newspaper.

"One of the great events connected with the present meeting of the British Association, was understood to be another scientific ascent by Mr. Glaisher and Mr. Coxwell. This ascent took place, and the popular interest excited was decidedly greater than that excited by any other event connected with the Association. Everybody could share the pleasure and excitement produced by a balloon ascent; and the great mass of our townsfolk did share in it. The Mayor, on the requisition of a number of our leading firms, had wisely appointed that the afternoon should be holden as a general holiday. The consequence was that all the positions surrounding the cricket ground, from which a view of the balloon could be obtained, were occupied early in the afternoon. In the enclosure itself, some hundreds of the members of the British Association were assembled. The inflation of the balloon began about half-past one in the afternoon, and was not completed till nearly six in the evening. The balloon employed on this occasion, we believe, was constructed by Mr. Coxwell specially for scientific ascents. It is of immense size and beautiful form, and requires 95,000 feet of gas to inflate it. Messrs. Coxwell and Glaisher usually perform their journeys alone; but on this occasion they were accompanied by Master G. W. Lee Glaisher, a son of Mr. Glaisher, about fourteen years of age, Captain Bond, Mr. Smith, and Mr. J. Pullan, one of our reporters. When Mr. Glaisher had arranged his delicate instruments, and Mr. Coxwell had adjusted his still more important

machinery, the aërial monster, amidst the plaudits of the spectators, swiftly and steadily left the earth. The clouds were low at the time, so that the balloon was speedily hidden by them. As it rose higher, however, it was seen and lost again repeatedly as a diminishing object in the heavens. Glistening in the sunlight, it was not entirely lost to view for half-an-hour after it left the earth. The ascent was made so near to the coast that the direction of the wind was a matter of some moment, and several "pilots" were dispatched to ascertain it. As the great balloon itself ascended, it took a southerly direction, but diverged slightly to the east as it got into higher currents of air. The proceedings were enlivened by the performances of the bands of the 1st Newcastle, and the Northumberland Artillery Volunteers, permitted to be present by the kindness of the commanding officers. The balloon was the Mammoth, with which Mr. Glaisher and Mr. Coxwell have made all their scientific ascents."

THE FATAL BALLOON ACCIDENT NEAR NOTTINGHAM.

During the meeting of the British Association at Newcastle-upon-Tyne, in August 1863, allusion was made to this regrettable circumstance by the *Newcastle Chronicle* in the following terms :—

"The lamentable occurrence which happened on Monday last is a fair theme for comment.

"There was a fête at Basford Park, near Nottingham, and Mr. Coxwell was announced to ascend with his balloon. This was not the famous 'Mammoth,' in which so many successful expeditions have been made, but a new

one, in which he himself had never journeyed. It was fully inflated by half-past five on Monday evening; the aëronaut took his place in the car, but soon found that, even without any ballast it would not lift him. Three times he made the experiment, but the gas was heavy and unfitted for its purpose. At this juncture a Mr. Chambers, son of a well-known aëronaut, stepped forward, and, remarking that he was a lighter man than Mr. Coxwell, by four stone, proposed to make the ascent in his stead. The public were getting impatient, and Mr. Coxwell, remembering the conduct of large crowds towards him on some former occasions, thought it probable enough that violence would be offered both to his property and to himself if the people missed the 'sensation' which had been promised. It would be shameful to insinuate a charge of timidity against a man who has given so many and such splendid proofs of courage; and there is no doubt that he was chiefly influenced by his desire to keep faith with the public. It must be borne in mind, also, that he knew Chambers had made many ascents from Cremorne Gardens and other places, though never in Mr. Coxwell's own company. There was, therefore, reasonable ground for supposing that he knew how to manage, and that there would be no danger in allowing him to take his seat in the car. A shower of rain was approaching; the impatience of the crowd increased, and in an unhappy moment Mr. Coxwell gave his consent. The ascent was a good one; all seemed going well, but suddenly it was observed that ballast was being thrown out. What could this mean? Mr. Coxwell shouted, warning Chambers of his

error; but it was persisted in; and although, by merely opening a valve—an operation not much more difficult than pulling a bell—this upward motion could have been checked, the balloon still rose. Ere long, however, it was lost in a dark cloud, and when next visible was descending rapidly, at a distance of six miles. According to Mr. Coxwell's theory, it had emerged into sunshine, when the gas of course expanded rapidly, and streamed out of the neck or safety valve, which, as those who have ascended know to their cost, is always left open. A few minutes afterwards the balloon came flapping down to the ground, near Scout Lane, Arnold; it rebounded again, and then settled on the earth. At the bottom of the car, a handkerchief in his mouth, the valve-cord twisted round his wrist, his left thigh fractured and some of his ribs broken, lay the unhappy man, gasping for breath. Death soon ensued, rather from suffocation than from the injuries received by the concussion.

"In no way does Mr. Coxwell deserve censure. It is plain that the accident was caused not by any flaw in the balloon, but by want of skill or nerve on the part of the unfortunate victim. The verdict of the jury completely exonerates the veteran aëronaut from blame; and the coroner wisely dwelt upon the fact that no pecuniary profit was to be gained by his allowing another person to ascend. It had, in fact, been just arranged that the balloon should be sent by itself, when this unfortunate man volunteered to take charge of it, as it would not lift Mr. Coxwell. This gives fresh point to the protests that we have made from time to time, and this melancholy incident must not

be allowed to throw discredit upon ballooning itself, when properly conducted by men of experience. For any one imperfectly acquainted with the proper means of ascending or descending, to undertake such a journey alone, is an act of temerity which will generally be terribly punished. Whatever cause rendered him so helpless—whether it was want of practice, sudden illness, or stupefaction produced by inhaling too much of the gas that came from the safety-valve—poor Chambers has paid a heavy price for his error. His fate, let us hope, will serve to deter others from running a similar risk without proper guidance; but it would be a serious misfortune if such an accident were distorted by ignorant comments into an argument against aërial exploration."

SECOND ASCENT FOR MILITARY OBJECTS.

The Naval and Military Intelligence of the first week in October, 1863, contained the following report of my ascent from the Royal Arsenal, Woolwich.

"The Members of the Ordnance Select Committee, with General Sir David Wood, R.A., Major-General Sandham, Governor of the Royal Military Academy; Brigade-Major Milward, and other officers, assembled at the Royal Arsenal to witness ascents with Mr. Coxwell's balloon, the War Department having sanctioned a series of experiments in order to ascertain the value of balloons when used to reconnoitre the movements of an army in the field, or to obtain information as to the position of an enemy's forces. The whole of the available troops in garrison had previously marched out in two divisions—the Royal Marines and Infantry, commanded by Colonel

Mitchell, to Chislehurst, and the Royal Artillery, commanded by Colonel Travers, to Bexley Heath. The balloon, having been inflated with 35,000 cubic feet of gas at the Arsenal works, was removed by a detachment of Royal Engineers to the Gun Park, and a rope attached to the balloon having been lashed to one of the guns, Mr. Coxwell ascended with Captain Heyman, Secretary of the Ordnance Select Committee, and other officers, and the troops were seen whilst returning home, headed by the bands of the two divisions. Ultimately, about five o'clock, the balloon was set free, and conveyed Mr. Coxwell, Captain Beaumont, and Lieut. Grover to Finchley, the eastern portion of the metropolis having been crossed as they proceeded in a somewhat circuitous direction."

M. NADAR'S BALLOON.

I must not take leave of this remarkable year in ballooning without a concise notice of the gigantic balloon constructed in Paris by M. Tournachon Nadar, *le beau* Nadar, as his friends loved to call the frank and jovial laughter-loving *compagnon*, the skilful photographer, whose tall, well-knit frame, pointed him out to the saunterers on the Boulevards. This ingenious Frenchman constructed a balloon, the dimensions of which far surpassed that of the Nassau balloon, or of my "Mammoth," the relative dimensions of which, in diameters, and cubic contents were as follows:—

Green's	in diameter	50 feet,	and cubic	contents	70,000	feet.
Coxwell's	,, over	55 ,,	,,	,,	93,000	,,
Nadar's	,,	74 ,,	,,	,,	215,000	,,

Underneath this huge machine was placed a smaller

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NADAR'S WICKER COTTAGE OR CAR.

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balloon, called a compensator, the intended use of which was to prevent loss of gas during the voyage, but I need hardly observe that the idea was not practically realised. The car was also of a fanciful, cumbersome, and cage-like form, being the model of a cottage in wicker-work, which had two stories of eight feet high and thirteen feet in length, and contained a small printing office, a photographic department, refreshment room, &c.

On October 4th, 1863, it was launched in Paris, when thirteen persons went up. At the descent at Meaux an accident to the valve-line occurred.

A week or two later another ascent was made, and after remaining aloft for the night, the balloon descended near Nieuburg in Hanover, a distance of about 400 miles having been accomplished, but a strong wind blew at the time, and the passengers were dragged for a long distance over the ground, and some of them were injured including M. Nadar. Before this voyage was undertaken Mr. Boley, the General Manager of the Crystal Palace, had gone over to Paris to engage Nadar for some ascents. It had been given out that the French aëronaut was about to make a trip to Russia, and his services at any cost were to be secured, as such a wonderful voyage would if really made, make Nadar popular in England.

The Manager, in rather an appealing manner, asked me if I would mind giving place to the enterprising Frenchman for the proposed ascents at Sydenham; I most readily assented, but with this proviso, that M. Nadar should travel to St. Petersburg in his balloon. Mr. Boley was personally quite persuaded that the journey in question

would be accomplished, and so I did not attempt to argue about it. I was on the point of going into Scotland, when a telegram arrived from Paris about the disastrous descent in Hanover, and requested that my next ascent from the Crystal Palace might be carried out according to previous arrangement, as the *Giant* balloon would not be in a condition to eclipse the *Mammoth* balloon, at any rate, not quite so soon as expected. It was to appear, however, at the Crystal Palace at no distant period, even if it was there blown out with atmospheric air—of course this additional information came by letter; the programme, however, so far as the "*blowing out*" went, was literally fulfilled, as the finely formed "Géant" was duly mended, and I remember gazing at it with admiration when it was suspended in the Central Transept. At the same time, I could not stifle a firm conviction that another mishap was in store for it, and that something would surely happen ere twelve hours had elapsed.

This fear was, as may be supposed, put down to professional jealousy; I was asked to go beneath it, to gaze upon its vast dimensions as it hung over head.

"On no account whatever," I replied.

"Why not?"

"Because it will come tumbling down by runs before many hours have passed."

At least, that was my settled opinion, and having openly stated it, I was not surprised next morning when Mr. Henry Thompson telegraphed to say that M. Nadar's balloon *had come down by the run* during the night, just as I had predicted, and then, after the prophecy had been

fulfilled, everybody wanted to know how it was I felt so certain as to the event taking place.

"It was simply self-evident," I replied. "The balloon had been hoisted up, and the net-work, instead of being allowed to embrace the lower part and thereby sustain the weight, was left hanging down and added two or three hundredweight to the silk, which was merely suspended by the valve."

I really thought it would come down before it did, and I could at once perceive that the true principles of practical aëronautics were either not understood or wantonly defied in this affair.

Subsequently it was suspended in a more ship-shape fashion, and attracted, for a time, considerable interest, but it did not extinguish the Mammoth balloon, as it never really ascended from the Palace grounds.

Some two or three years later it passed into other hands, and was ultimately wrecked at Cremorne Gardens.

GODARD'S FIRE BALLOON, 1864.

M. Godard made an ascent in his huge "Montgolfier," or heated-air balloon, from Cremorne Gardens in the presence of some thousands of people. From the same place, and at the same time, Mr. Adams ascended in a balloon called the "Prince of Wales," which was inflated by gas in the ordinary way; but the two in point of size and appearance were out of all comparison, and the interest of the spectators were almost exclusively concentrated on that of M. Godard, in reference to which, the other looked like a mere satellite. The vast difference in size between the two, might have induced the belief that the English balloon had

been selected to set off by contrast the magnificent proportions of its rival, which would not have been so striking, if my large balloon had been put in comparison with it. Still, the "Montgolfier" was an enormous structure, and exceeded in size the famous "Géant" balloon of M. Nadar, being 117ft. in height, and 95ft. 9in. in diameter. It was pear-shaped, and made of canvas, but not lined throughout the inside with silk. It was ornamented on the outside with representations of the French eagle, and was encircled at about a third of its height from the top with a parachute arrangement, resembling the wings of a bat, and divided into twenty-four compartments. The upper part of the machine was surrounded with a blue border, and from its neck or lower end the car was suspended, with the furnace immediately above, the flame of which was visible from the earth as the balloon floated among the clouds, a dark gray mass, distinct in its elegant outline. The balloon itself, with all its appendages, weighed upwards of 4,620lbs., and its cubic capacity was 498,556ft. The car weighed 585lbs., and was upwards of thirteen feet in diameter. It was surrounded by a rail, breast high.

The furnace for inflating the balloon was placed in the centre of the car, and weighed, with the chimney, 380lb. It was 6ft. 6in. in diameter, and consisted of three cylinders, so arranged as to counteract the effects of the radiated heat upon the occupants of the car, having also a metal colander inside the flue to intercept sparks from the fire below. The heated air for inflating the balloon was generated by burning rye straw, cleaned from the ears, and compressed into small bundles. For the purpose of infla-

M. GODARD'S FIRE BALLOON. [*To face p.* 209.

tion, the balloon was suspended from a horizontal rope attached to two masts, each upwards of 100ft. high. About three-quarters of an hour altogether were consumed in the process, which was watched with eager interest by the crowd. The stokers kept constantly feeding the furnace, in the interval, with the compressed straw, until the huge mass was completely distended. There was a brisk wind, and at one time the balloon swayed much to and fro in the process of inflation, and looked as if it would break away from its moorings. At length, all being ready, M. Godard, accompanied by several gentlemen, entered the car, and the balloon arose amid the enthusiastic cheers of the crowd. A moment or two before that, Mr. Adams, in his gas-balloon, had shot up into the air almost with the rapidity of a rocket, a proceeding which had a rather ludicrous effect in comparison with the stately ascent of the other. He soared to a great height compared with M. Godard and his companions, who appeared to be just at a convenient altitude for taking a bird's-eye view of London. Both balloons took an easterly course, that of M. Godard diverging rather more towards the north than the other, and both were watched with much interest by the crowd at the starting point until they passed out of sight. The Godard balloon descended on the marshes of the River Lea, near Walthamstow. It ascended again and proceeded from Mr. Boston's to Mr. Tasker's farm, where the grappling irons were thrown out and caught a tree. The balloon then swayed about with great violence against the tree, the branches of which it broke. Serious damage was done to the balloon and car. Some of the party in the

car jumped out as it was descending, and one had his leg sprained, while another was cut about the face and hands, not, I believe, seriously.

When the trial trip of this fire-balloon came off on July 20th, 1864, from Cremorne Gardens, the late Colonel Burnaby ascended, and also the late Mr. Prowse, of the *Daily Telegraph*. Mr. Norris, a famous amateur aëronaut, was also one of the party, I believe, and as all these gentlemen had frequently ascended with me, I went to see them off, as did Mr. Glaisher.

I met Mr. Prowse during the evening of the ascent on his return to Fleet Street, and he read to me the following pleasing description of the first descent, which I here subjoin:—

"Three times already had the balloon passed over the Thames; and when it was resolved to alight, M. Godard was over the Isle of Dogs. He had fixed his eye, however, upon the East Greenwich marshes, as an open space in which the descent could be safely attempted. Very nicely and skilfully calculated were his manœuvres. Traversing the Thames at an exceedingly low elevation, the balloon just grounded upon the shore, within a dozen yards of the water. Distinctly to understand the fierce excitement of the next three minutes, it should be borne in mind that the fire was still roaring merrily away; that the machinery, so admirable for its special purposes, would have caused sad havoc had there been anything like a general upset; and that, at this particular moment, six men could exert very little control over a balloon capable of containing 460,000 cubic feet of air. Touching the shore, the balloon

tore away, the big canvas flapping, the bright fire burning, whilst right in front rose a stone embankment. The shocks were rough, and had the travellers been novices in this particular method of locomotion, we might now have some awkward casualities to relate. Just before each bump, however, we made a little leap, and thus baulked its force, as a cricketer to catch a ball draws back his hand instead of protruding it. Still, with all these precautions, it was a nasty drive; it occupied perhaps a minute—it seemed half-an-hour—and there was a strong inclination to cheer when the threatening stones were passed. On now into a potato field; another rise; a wild tendency to leap at a chimney; a strong 'exhibition' of restraint in the shape of a hundred sensible Englishmen tugging away at the ropes, and obeying the orders that were given—and the whole thing was over.

"It is improbable that, as at present managed, the system so gallantly adopted by M. Godard can really help aërostatics as a science; but it would be less than generous, it would be less than just, to conclude this notice without a cordial recognition of that gentleman's bravery and skill. He had to contend against many disadvantages; he met them all in a spirit of cheerful good temper and chivalric self-reliance. It is to the ordinary gas-balloon that Mr. Glaisher still adheres as a means of prosecuting his researches; but the old 'fire-balloon,' with all its new improvements, adjuncts, and accessories, could not have been introduced to the English public by a more determined, devoted, or courteous gentleman than M. Jean Godard, aëronaut to his Majesty the Emperor

of the French. This testimony to his signal merits will be cheerfully endorsed by all who have ever shared his perils—by the five travellers who accompanied him yesterday, as by those who risked their lives with M. Nadar."

CHAPTER XI.

SELECTIONS FROM THE REMAINDER OF MY LIFE.

TO give more than a few of the frequent ascents made by Mr. Glaisher and myself is all that I can now attempt. I would gladly advert to the scientific voyages and experiments, made year after year, but to do so I should require more space than is at my disposal. I must refer my readers, therefore, to Mr. Glaisher's admirable work entitled "Travels in the Air," which combine the experiences of M. Flammarion and M. de Fonvielle, and also those by the Brothers Tissandier, who rank so high in aërostation.

I will, therefore, glance chiefly at the next six-and-twenty years of my life, and in so doing I shall not show special favour to those ascents, which are, in a scientific point of view, the more important, as public and popular trips possess sometimes a larger amount of entertaining matter for general readers, the class to which I address myself. For these I have prepared a variety of selections which aim, if possible, at "ringing the changes," and not harping upon one string, which becomes too monotonous to be pleasing for those who have not been students in ballooning, but are nevertheless disposed to take a glance at the

subject if they can be interested in its teachings and in its followers.

If there is one locality to which I should like ample space to advert, it is York, and although I believe that my reasons for an earnest and affectionate remembrance of this ancient City would be better liked by Yorkshiremen if I give them in my own words, still I would rather convey them in this page by an extract from the *Gardening World* of June 11th, 1887, as it is a delicate matter to speak of one's self in terms of eulogy.

The article was written by Mr. Dean, who stood high as a judge and promoter of the Horticultural department as well as the other attractions of the York gala.

It begins with the first Exhibition in the year 1859, which had the approval and patronage of His Grace the Archbishop of York, and many of the noblemen and gentlemen of the County.

"The grounds in which the fêtes were held could not be used without special permission. On the first occasion the band of the Coldstream Guards appeared and assisted at a concert given on the evening prior to the exhibition.

"Mr. Coxwell made his first balloon ascent from York, and a brass band contest terminated the evening's amusements. The fête was a decided success, the total receipts amounting to £1,252, and the committee granted 100 guineas to the charitable institutions of the city, which sum was further increased by the guarantors' generous help.

"The distinguished patronage of Her Majesty and the late Prince Consort was, in the year 1860, thought to be

desirable, and Mr. John Wilson, the secretary, obtained this for the society through the influence of the city members.

"Mr. Henry Coxwell," the writer added, "was engaged every year up to and including the year 1886, but his retirement into private life at the close of last year breaks off the pleasant associations betwixt himself, the committee of the York Gala, and the visitors there.

"In the year 1865, Mr. Alderman Wade, *The Lord Mayor* in that year, accompanied Mr. Coxwell in the ascent, a most favourable one, and Mr. Wade is happily still living and taking an active part in each succeeding gala.

"The ascent was made in a new balloon, and the ceremony of christening was performed by Miss Wade, who was the Lady Mayoress, the name of "Research" being inscribed on it."

A SKETCH OF THE GALA TIME AT YORK.

In order that those readers who do not happen to be very well acquainted with this part, may still bring the leading features of the rejoicings before the mind's eye, I intend to offer one or two general sketches of the place and the people.

A stranger arriving some years since to witness the proceedings would have been particularly struck by the vast crowds of people who were all going in a northerly direction from the railway station, and were consequently showing the way to the field at Bootham, where the gala has been for nearly thirty years invariably held.

Everybody was running hither and thither to be present at the opening ceremony of the festivities, and to be as

early as possible at the great flower-show while the bloom and freshness were on the exhibits, and while, if possible, the judges and leading aristocracy were going their rounds of inspection, previous to the "masses" being let in on the following days.

There were large prizes given, amounting to nearly £600, so that it was a big affair, as indicated by the gigantic tents, with their different shapes and contents.

On emerging from the fruit and flower department, the aforesaid stranger would have seen before him a long façade of tents of another description, viz., refreshment booths, which extended nearly to the bottom of a ten-acre field, with lime trees on one side as well as a fine palatial residence at the end of the grounds, a glance at which building served to show that it was the County Lunatic Asylum.

There was a strange combination of temporary and permanent edifices, including a sightly round-looking dome, which was held up without poles or tackle of any kind, and enclosed within a circle of wooden barriers.

"What on earth is that?"

"The balloon, the great balloon, Sir," was the reply.

"Really, and what a stupendous affair to be sure; and that scaffolding beyond and the other devices; what are they?"

"For Mr. James Pain's fireworks, and for the trapeze performers."

"Well, well; and all those coloured waggons of yellow and red, with the stretches of galleries beyond?"

"They are the shooting concerns for rifle practice."

"And the stage there on the left?"

"That is for the vocal, instrumental, and theatrical people from London and Manchester, Leeds and Newcastle-upon-Tyne, who will appear and be duly marshalled at the appointed hour."

"Bless me, and what was that I heard?"

"The Minster Bells."

The bands were heard later on, after certain official looking gentry had approached the balloon.

They consisted of the Lord Mayor, Aldermen, Committee, Judges of the Fruit and Flowers, and the heads of the city, who were gathering, as was their wont, around the aëronaut just before the luncheon hour.

A friendly greeting of the most cordial kind would then have been witnessed by the stranger. I was called from my active duties from beneath the folds of the balloon, and, after the entire party had paid their customary respects, I was formally invited by the Lord Mayor to go in with them to luncheon.

Among this group of townsmen were three notable individuals who had often ascended, and who were described to the inquisitive looker on as Mr. Tom Smith, Mr. George Browne, and Mr. Cooper; they were Committeemen, but, like Mr. Alderman Wade, they were not always within the gates or bars of York, as they now and and again laid aside their civic duties and went off a little in gala times, when, they were aëronautically inclined, and whenever I appeared on the scene, one or the other of them would not, as a rule, be far distant, for they were like-minded in this respect, although in matters of business

they were of different occupations, and it is doubtful whether in politics or other matters they were at all agreed; yet no sooner did they enter upon aëronautics, or assemble together during those interesting moments which precede an ascent, than the most perfect harmony of sentiment prevailed; indeed, they appeared to vie with each other in alluding to the delights of air travelling, and were regarded as authorities on the subject, and many were the questions put to them and answered, especially at the festive board when called upon to fight their battles over again, and invariably they did so to the delight of those who were near them, as were several when they drew up at the luncheon table, while the Lord Mayor, Sir Joseph Terry, took his place as Chairman.

The stranger, who could have seen and heard through a side opening in the Committee tent, where refreshment was served, would have fancied at first, by the leisurely way the guests had sauntered down, that their appetites were unequal to the occasion, but as soon as the party had ranged up to the tables and grace been said, while an appetising odour arose from the salmon and sliced cucumber, from the fowls, ducks, pigeon-pies, and lamb, which covered the tables in profusion, he would have found himself mistaken.

We aëronauts were not so ready as several more *earthly looking personages* to open fire on the creature comforts, and Messrs. Smith, Browne, Cooper, and your humble servant, had to run the gauntlet of some jokes as to our being such ethereal beings; tempting morsels, particularly the nicest dishes, were disappearing with alarming rapidity,

when Mr. Browne and the others woke up from an aërial reverie, and, as if to repudiate the intimation that we could live on air, a splendid capon, which was keeping company with a nice tongue, was soon cut up, and we began to make amends for lost time. Mr. Tom Smith catching the eye of an old knowing-looking waiter, merely winked, when some of the choicest edibles were placed close in front of us; another wink from Mr. Browne and wine appeared, and not long after Mr. Cooper, who was always more vivacious after a sip of champagne, added his part of the performance.

Of course there were many toasts, and so forth, made from the Chair, occupied by Sir Joseph Terry, and the aëronauts were in due course called upon to respond.

After these preliminaries had ended, Mr. Cooper was called out of the tent, as one of the assistants who was left in charge of the balloon wanted to explain to that gentleman that there had been a row among the men during our absence, and that I and the Field Manager, Mr. Cooper, had better come and see to it.

We did so, but it was all about a trifle; there were two rival parties among the thirty workmen whose office it was to hold the netting of the balloon, some were teetotallers and others were not. These two classes did not agree, hence a fuss ensued, and one of the teetotallers was accused of stealing some food as it passed along to its destination. The matter was too absurd, but the assistant balloonist was very angry, and vowed that when he saw the offending teetotaller returning he would "*have it out of him.*"

Two policemen had overheard what had been stated, but

the whole affair was pronounced a farce. The assistant, however, as the accused passed him, made a chalk mark on his back, as much as to imply that he was scored, and then, the luncheon and dinner hour having passed, the bands began to discourse splendid music, the sharp crack of numerous rifles was heard from the shooting places, the tenor and bass vocalists were seen to mount the stage, and the balloon had been fed so generously from the large six inch main that it had a goodly share of admirers, who had gathered several feet around the barriers, and all seemed to go to the satisfaction of the visitors.

There was something about one of the strangers which commended him to our party, so that he was invited inside the enclosure, where he was ready to give a helping hand if asked to do so.

Having given orders to loosen the hooks of the sand-bags so as to get the lower lines clear for attachment to the hoop, the assistant balloonist wanted some help to put on an extra hose; the teetotaller, who was the personification of officiousness, rushed forward to make himself conspicuous, but he was eyed by the other with a searching and sly look. While the neck was free, the stranger, who had a pleasing face, was invited to have a look up inside the balloon, a sight which he and one or two others enjoyed; it was then that the teetotaller put his head in to have a peep, but those who understand these matters noticed that the assistant balloonist drew the neck well over his head, and a gust of wind at that moment driving the gas downwards, and no air being able to pass upwards to supply his lungs, the abstainer took in such a gulp of

gaseous fluid that when his head was let out of chancery, as the movement was designated, he was seen to look uncommonly pale. He had to retire from the public gaze, and did not reappear that day, so that the vow made by the assistant "*to take it out of him*" was literally to some extent carried out.

Mr. Tom Smith noticed that the stranger had lost colour in his face, and asked him to the Committee tent to take some refreshment; it there transpired that he was in need of such, as the gas inhaled while looking inside the balloon had produced nausea, and as he had not tasted food since he entered the city, he accepted Mr. Smith's offer. After this attention, the stranger made enquiry about the possibility of his going up, and he had fallen into excellent hands, as a ticket was procured for him by Mr. Smith, who stated that he was going himself, so that they returned together after a walk round the Flower Show and a chat with the bandmaster, for Mr. Smith was a great musician, and could play the violin and other instruments remarkably well.

"We must not lose much time," he said, "for I perceive that the car is attached and my old friend is in."

As this was the half-crown day of the fête and the attendance composed chiefly of the *élite*, the aërial party was not numerous, but it was select, consisting of two or three visitors besides the stranger, myself, and the three amateur aëronauts.

It was my desire, while we were suspended over York, to get up a short descriptive lecture from one and the other

about the magnificent view which was mapped out beneath us. We all were more or less contributors.

The substance of what was said amounted to this:—

How charming it was to look down upon so ancient a city, with all the most striking modern embellishments. In gazing upon this scene, we wondered how a balloon would have seemed at the time of the Roman occupation.

"You can perceive, Sir," I said, addressing the stranger, "the city walls, the bars and gates, and beneath you see the beautiful ruins of St. Mary's Abbey. That little stream as it seems to us, which stretches in a northerly direction, is the River Ouse, and there, gentlemen, we perceive—

> Beyond in lofty Majesty,
> The Minster Towers arise on high.
> Fit temple of the Deity."

"But we scarcely realize that poetic description," observed the stranger, "from our present position, the Minster only looks like a model."

"True, but recollect the dimensions."

"Five hundred and twenty-four feet from east to west," some one added.

"And two hundred and fifty feet from north to south," cried another.

"And the height of the roofs, both of nave and choir, exceed every other English Cathedral," said a third.

"Most interesting," exclaimed the stranger.

"And please not to overlook, gentlemen, that it is built in the form of a cross, and that further south we see the spires of old Ebor's many churches."

"I note the new bridge," said the stranger, "and how

tiny that looks; what are the buildings to which I point?"

"That square tower built over a single arch, which you will barely make out up here, is Micklegate Bar; the other to which I am pointing is Monk Bar, so called after General Monk, the Hero of the Restoration, and away to the west near the village of Holgate, down yonder, the Emperor Severus died, but it is impossible," I observed, "to distinguish many more of the buildings and institutions, as we are moving away and shall soon enter a cloud."

"Where, pray, is your race-course?" asked the stranger.

"There you see 'Knavesmire' to the south."

"But," interposed one of our party, "you are pointing to York Castle."

A laugh was now raised, but the stranger appreciated the point by laughing too, as he was very well aware of the use to which the Castle was now turned, and he hoped that none of us had either a friend or a relation there.

A fine cloud was then entered, and after this pleasing transition was appreciated, we bore off towards Castle Howard and Malton.

REPORTERS IN CLOUDLAND.

Mr. J. Blenkin, of the *York Herald*, said:—

"The balloon ascent has been a judicious accompaniment of every gala which has been held in the city, and has lost none of its attractiveness, for round the substantial enclosure which had been constructed for the occasion, large numbers crowded to watch the progress of inflation. This was completed upwards of an hour before the time

fixed for the ascent, and, as there was scarcely sufficient breeze at the time to flutter the flags which in various parts decked the ground, opportunity was taken to give a number of partial ascents. Those desirous of taking short aërial trips, however, far outweighed in number the time or frequency of ascent which could be afforded them, and when the period for the permanent ascent arrived, scarcely a tithe of the applicants had been accommodated.

"At length the occupants of the car, besides Mr. Coxwell, being confined to Mr. Tom Smith, Mr. Arthur Thompson, of Heworth, Mr. Ward and Mr. George Hebblethwaite, of York, Mr. Blenkin, of the *York Herald*, and Mr. J. Pearson, of the *Yorkshire Gazette*, a delightful ascent was made, as usual, amidst the congratulatory cheers of those present. A slowish progress was taken in precisely the same direction as that of the preceding evening, namely, S.S.W., and whilst remaining fully in sight of the spectators, illustrations were given of Mr. Coxwell's semaphore system of war signals.

"By means of four differently coloured arms, which were worked up and down by pulleys from the sides of the balloon, it was shown how information may be conveyed of the movements or stratagems of one opposing army to another. Though the progress across country was slow, that upwards was rapid, and very soon the aëronauts were informed that they had attained an altitude of 2300 feet. Here Mr. Coxwell, after drinking in lemonade the health of those present, commenced pointing out various interesting features common to such occasions. At a height of 3000 feet the bells of the Cathedral were distinctly

heard, as also was the shrill whistle of the engine of a train which, like a streak of light, appeared to creep its way towards the city. At ten minutes past six, when we were very high, the thermometer was declared to be two degrees below freezing point; and about this time, in the presence of some difference of opinion amongst the aëronauts as to the names of places below them, they were facetiously informed by Mr. Coxwell that it was their privilege to get to high words, but they were not by any means to fall out. A number of clouds had been observed to the south-east, and it being the desire to enter one of them, sand was discharged, and at length, at an altitude of a mile and 300 feet, the balloon was wrapped in a cold vapour of such density as to entirely obscure all vision of things below. Songs, sentimental and comic, were indulged in, and to the inquiry of, "Where are we now?" a drop of about 1500 feet was made, and disclosed the situation to be over the road to Tadcaster, whither, a little to the left, the balloon was gradually drifting.

"Over the village of Bolton, when at an altitude of 2300 feet, distinct answers were given from below to questions put by the aëronauts. In the extreme extent of vision the course of the Humber had been observed on the one side, and the Cleveland Hills on the other, whilst due south nothing but a perfect flat was observable. Some remarkably pretty and novel effects were perceived in the playing of the setting sun upon the clouds which formed the horizon.

"The fright which appeared to seize upon cattle and sheep as they pastured on the fields, and the singularity

of their appearance from above as they scampered about, was a source of considerable amusement. At length the party were consulted as to where they would prefer to alight. Immediately below lay Grimston Park, and the well-known mansion of its hospitable owner, and in the presence of this fact there could be but one opinion as to where the journey should end. Mr. Coxwell, therefore, pointing to a clump of trees, which more like a patch of winter broccoli dotting the landscape, remarked that he would drop within thirty yards of it, and in this respect he most religiously kept his word. With a nice regulation of the escape valve, the grapnel was brought to drag, and at once took a hold at the very spot desired, and the car of the balloon again touched earth even more gently than had been the case in the partial ascents which had preceded.

"Assistance at once came running in from all sides, and though the noble owner of the estate was absent from home, a hearty welcome was soon accorded to the party by the Rev. N. G. J. Starton, of Milford Hall, the vicar of Kirby Wharfe, whilst the good-tempered features of Mr. Harris (Lord Londesborough's armourer), glowed with delight as he gripped the hand of his visitors. To divest the balloon of gas, pack it up, and by means of a conveyance kindly tendered from the hall, to send it to the Ulleskelf station was a task of speedy completion; and a train happening to pass at the time, a return to the city and the gala ground was made by the whole party by about nine o'clock."

MY PROPOSAL TO HOLD A FREEMASONS' MEETING IN THE CLOUDS.

Mr. J. Pearson of the *Yorkshire Gazette*, alluded on the second day of the fête, to the carrying out of an idea I had for some time entertained, but the reporter did not mention that we had a lady *Mason* with us when the novel affair was spoken of; any how, it was a fair voyageur *named Mason*, who went up and kindly christened the "York Express."

I must leave the rest to *the Chiel amang us*, who was taking notes, and who printed them to this effect:—

"To the fact that the balloon was new, reference has already been made, and as one of the fair sex in the person of Mrs. Mason was of its voyageurs on Wednesday, to her was accorded the task of christening it. This ceremony was performed almost immediately before its first ascent, by the cracking of a bottle of champagne, which left the balloon with the future complimentary title to the city, of 'Coxwell's York Express.' The capacity of the balloon was 60,000 feet, and with fully this amount of gas it was inflated on both days. It may be added, that on Wednesday, it had been intended to have taken up a number of York Freemasons, to hold a Lodge of the Craft in the air, and then to have partaken of a banquet improvised for the occasion, but this was an idea which, unfortunately for the interest of the ascent, fell through, in consequence, as we understand, of some doubt as to whether such a proceeding would be constitutional. It is Mr. Coxwell's full intention, however, to carry out the idea at some early period, of holding a Freemasons' Lodge in the

clouds. Mr. Coxwell has now completed his 556th ascent, a fact which is its own testimony as to the care and intelligence he has brought to bear in his practice of aërostation. Than himself, no other gentleman of his class has had such important experimental scientific interests intrusted to him in the company of Mr. Glaisher, and his annual return to the city will be gladly welcomed in connection with future galas. Mr. Coxwell's next ascent in the 'York Express,' will take place early next week from the Crystal Palace, Sydenham, by private arrangement with Captain F. Woodgate, of Norwood, London, who will be accompanied by his lady and a party of friends."

CHAPTER XII.

MY NEW BALLOON, "BRITANNIA."

WHEN the *Daily Telegraph* provided its numerous readers with those varied and entertaining letters on Luck, I could have furnished a small contribution as to lucky and unlucky balloons, but I thought it better not to introduce my speciality into the discussion, especially as I am not what may be called an absolute "believer" in this direction. At the same time I could easily mention several occurrences in my own experience which might be viewed as due to the favour of fortune, and, on the other hand, I could adduce facts which would certainly not be viewed with satisfaction by the votaries of the fickle goddess, but as I do not propose to argue the case here, I will merely state that I have had balloons which never attained any great age or elevation, although carefully designed and considerately used, and owing to adverse circumstances never had more than a limited amount of success.

For instance, my balloons Sylph, Mars, Queen, Evening Star, and Mammoth, were the most lucky of my aërial fleet, as were at a more recent date the York Express and the City of York. But the Britannia, although she bor a glorious name, never made more than half-a-dozen ascents before she came to an untimely and ignominious end, and in a way, too, which made a great stir throughout

the country, but as the rising generation will not know much about this event, I may as well recapitulate the leading facts just as they were described at the time by myself and another who was an eye-witness of what took place; and as he had never seen me or my balloon before, his testimony is of importance.

BALLOON RIOT AT LEICESTER.

To the Editor of *The Times*.

"Sir,—The wanton destruction of my new Britannia balloon, the burning of the car in which Mr. Glaisher and I have made all the scientific ascents, together with my own escape from personal injury, are matters sufficiently important for troubling you with an explanatory letter. I was engaged to ascend on Monday the 11th, at Leicester, the occasion being a grand demonstration of the Foresters on the racecourse, where about fifteen acres had been closed in, and a special enclosure made for the protection and inflation of my large balloon, just recently constructed. The subordinate arrangements were not, however, in harmony with the extensive preparations made before the *fête* day. There was no barrier around the balloon, and there were, as I heard stated in the presence of the Town Clerk, only eight policemen engaged, and throughout the day I was often left to shift for myself without that assistance being received which belongs to so great an undertaking.

"Although 50,000 persons were present, I had to beg hard for a policeman, but it is only an act of justice to acknowledge that, when one was sent, he proved a most efficient constable. Early in the afternoon a gentleman, *reported* to be a provincial aëronaut, gave it out that the

balloon then present was not my largest and newest balloon, but a small one.

"This was a cruel libel, and aroused, I was told, an angry feeling among the visitors. The lack of policemen to maintain order soon manifested itself, for on a band entering the balloon ground, the boards were carried at once, and thousands of persons broke in and harassed my operations excessively. It was in vain that I entreated for, and that several gentlemen succeeded in clearing, an open space, the deficiency of strong barriers having afforded access, all subsequent attempts to stop the tide of human pressure proved unavailing. What made matters worse was the fact that before the ascent could possibly take place the balloon must needs be removed into an open space. Considerable time was occupied in pulling down the scaffold, poles, and hoarding, and those who promised to do this were found wanting when their services were most required. At last the balloon was taken out; but here we were in a perfect sea of clamouring spectators to the number of 50,000 persons, no one appearing to understand that any impediment was offered, and yet everybody demanding an instantaneous ascent. A third difficulty was this—I had agreed to a share arrangement as to the seats in the car, and those who had paid their money and obtained tickets pounced into the basket in such a rude unceremonious manner that all operations were stopped, and the passengers themselves were preventing their own departure. One person seated in my car was a disgrace to his town, as by his gestures and foul language, he excited the mob, and induced the belief that there existed a dis-

inclination on my part to ascend, whereas I was entreating for the opportunity of being able to do so with safety to those who entrusted themselves to my care. The pressure of the mob was now so great that my car was damaged, the network broken in several places, owing to persons hanging on to the lower meshes, and a bottle was thrown into the balloon, which, by-the-bye, I was not aware of myself at the time. I now threatened that unless a ring were made, I would let out the gas, so as not to endanger the lives of my passengers, among whom were two ladies. As I only got abuse for my earnest appeal, especially from one or two in the car, I forthwith executed my threat. There were no doubt around me the very scum of the collected thousands, but I should be sorry to charge them with being, or suppose them to be Foresters. A few, however, certainly belonged to the order, as they wore the distinguishing marks, and I could readily identify them.

"Inspector Haynes and Sergeant Chapman were now doing honour to the police force, and were battling away manfully with the crowd. It was brave but hard work, for nothing short of the destruction of my balloon, and indeed an attempt on my own life, appeared a sufficient sacrifice. While the work of demolition was proceeding, Sergeant Chapman led me away amid yelling and derison. My clothes were soon torn, and then the cry was raised, 'rip him up,' 'knock him on the head,' 'finish him,' &c., all of which would have inevitably been executed had I not followed the Inspector's advice. I was kindly sheltered and protected by Mr. Stone, the Town Clerk of Leicester, whose residence is near the race-course.

"It soon transpired that the car had been made a bonfire of, the hoop, that would not burn through, was paraded in the streets, the balloon itself was torn to shreds, and the pieces sold at various prices; and I verily believe that all this was attributable simply to a want of foresight in not providing sufficient policemen, to keep in check so large a gathering of Foresters.

"I remain, Sir, yours obediently,

"HENRY COXWELL."

"Tottenham, *July* 12*th*.

BY AN EYE-WITNESS.

To the Editor of *The Times*.

"Sir,—Leicester has been the scene of a disgraceful riot, on the occasion of the Foresters' *fête* on the racecourse. Among the entertainments provided, Mr. Coxwell was to ascend in his balloon at 5.30. The arrangements for the keeping of the ground, however, were so bad as to preclude the possibility of Mr. Coxwell making his necessary, and of course, most important, arrangements. The temporary barriers round the balloon were broken down soon after 2 p.m., and the dense mob rushed in, surrounding the balloon and setting Mr. Coxwell at defiance. But five of the police force were present, and their efforts were fruitless and feeble in the extreme. Mr. Coxwell had a large party about to ascend with him, and they had to fight their way to the car. Mr. Coxwell, in my hearing, sent to the committe for assistance at least a dozen times, to no purpose. He wanted carpenters to remove the hoarding, but they were not provided. His position was difficult in the extreme. He, however, made an effort, but the crowd

clung to the netting, and ultimately broke it; he got from the enclosure still held by the crowd. He could get no clearance; one of the anchors or grapplers was dragging persons to the ground, the car became partly detached from the balloon, when Mr. Coxwell opened the valve and allowed the gas to escape. As soon as the mob perceived this they rushed to the balloon on all sides, clinging, tearing, and trampling, and then some brutal persons seized upon Mr. Coxwell, knocked his cap from his head, tore his coat from skirt to collar, and hustled him in every direction. He was calm and silent. I lent him my hat, and called upon the police to protect him, which they tried to do. We conveyed him to the residence of a Mr. North, where I left him. The police were embarrassed and in helpless confusion; proposing the toll-house or anywhere, Mr. Coxwell wished to be taken to a resident justice, the mob following, execrating him in language too abominable to be repeated. I never witnessed such barbarous ignorance, baseness, and injustice, in my life; I feared Mr. Coxwell would have been killed. I was knocked down thrice myself simply for endeavouring to defend him.

"I would add, I never saw Mr. Coxwell before. I write this on the moment, as the experience of an eye-witness, and one anxious to do justice to a shamefully ill-used man, mobbed because he endeavoured to preserve the lives of the public. Previous to the attempted ascent, one poor woman was removed to the infirmary with her back broken, and many others were injured.

"I am, Sir, yours truly,

"A VISITOR TO THE FÊTE."

COMPENSATION FOR THE LOSS SUSTAINED.

A local paper wrote as follows—

"Circumstances that have taken place during the last few days, render it necessary to revert to the occurrences in Leicester, at the Foresters' fête, on the 11th July last. On that occasion, it will be remembered, that Mr. Coxwell's balloon was destroyed, its destruction involving, of course, considerable pecuniary loss. The Foresters were applied to for subscriptions for the reimbursement of Mr. Coxwell, but, as the rules of the Order render a considerable delay inevitable before the appeal can be made to them as a body, the result of it will have to be waited for. In the meantime, subscriptions were made by some gentlemen of the town of Leicester, which were handed over to Mr. Glaisher, the chairman of the London Committee, on behalf of Mr. Coxwell. To these subscriptions were added a sum of £386 by Mr. E. S. Ellis, making the total amount from Leicester, £500. Thus, it is evident, that public spirit is still existent in Leicester, in this, its period of unequalled prosperity, as it ever has been during the long ages of its history. But, though this large sum was promptly advanced by Mr. E. S. Ellis, it cannot be supposed that that gentleman will be allowed to bear so disproportionate a share of responsibility. The Foresters have their part to perform, and from their vast numbers, there is no reason to doubt that they will, as soon as their rules permit them to act in the matter, do it satisfactorily in every respect. Their first duty will be to repay to Mr. Ellis the sum he so generously paid over to Mr. Coxwell. That they will do this we cannot doubt, nor do we believe that they require

any prompting to do so. However this may be, under any circumstances, Mr. Ellis must not be allowed to be the sufferer. If all other parties should fail in the performance of their duty towards that gentleman, his townsmen, we feel convinced, will take the matter in hand, and speedily testify their appreciation of the promptitude with which he came forward at the crisis when his aid was required."

MR. GLAISHER RENDERS FRIENDLY AID.

That gentleman espoused my cause from the first, while Mr. C. J. Carttar, one of the coroners for Kent, acted as my solicitor, and made an eloquent speech at the Town Hall, which had a favourable influence on the Mayor, Mr. Ellis, and others.

In London, Mr. Glaisher formed a committee, and headed the list himself, a handsome sum was also given by his friend Mr. S. W. Silver, who contributed most liberally. Dr. Corry, and others who had ascended in the Britannia, took up the cause in Belfast, and many of the officers of the Life Guards subscribed towards another balloon which was to be still larger than the lost one.

I remember dining one evening with Captain Burnaby and Lieutenant Westcar at the Horse Guards, while the latter officer was on duty. Mr. Glaisher was of the party, and while he and the late hero of Soudanese celebrity were gossiping, I went round the stables with Lieutenant Westcar, who was nearly as tall, though not so stout or finely proportioned as Captain Burnaby.

The sentries had been relieved, and the fine helmeted fellows became to me the subjects of admiration. I was

not feeling particularly well myself and made some passing remarks about health and strength, and went so far as to say that I had no doubt that his aërial voyages would be recounted in the course of conversation as well as those of Captain Burnaby's and other officers *long after my time.*

"It is not at all unlikely," he replied, "that you may outlive many of us, and although Mr. Glaisher is ten years your senior, I fancy there is long life in him, and Professor Owen must have thought so too, or he would not have spoken as he did at the Newcastle meeting last year."

This hopeful remark did me no harm, I recollect at the time, but I certainly never expected that we should see these noble-looking fellows out, and that we should both remain after their departure.

ASCENTS IN IRELAND, 1864 AND 1865.

The time has now arrived when I am compelled in order to complete my Life in this volume, to finish up with decades instead of successive years, a few typical voyages being compressed into as small a space as possible.

It was not many days before the destruction of the "Britannia," that I ascended with that balloon from the Royal Botanic Gardens, in Belfast. A cattle show was held at the same time, and this induced the railway companies to issue return tickets admitting the bearers to the Gardens and the showyard at reduced rates, the result being an immense influx of visitors.

Every road leading to Belfast was thronged with visitors

of every conceivable description. The interest taken in the affair by the townspeople was just as great as was created in the country. A continuous stream of people, some on foot, others on cars, and others in carriages and omnibuses flowed up the road. The narrow entrance to the Botanic Gardens was soon blocked up, and the crushing and excitement were tremendous.

It was nearly five o'clock before we got off. The occupants of the car, besides myself, were Captain Matthew Hale, Cameronians; Captain Tullock, 96th Regiment; Mr. Rowan, 62nd Regiment; Mr. Alexander Porter, University Square; Mr. Robert Kingan, a gentleman from Armagh, and Dr. Corry, Clarendon Place. Mr. Alexander F. Herdman, Donegal Square, South, and Mr. George Mc. Tear, junior, Carlisle Terrace, had to get out as there was a stiff breze blowing from the west, but the "Britannia" rose splendidly, and took an easterly direction. Nothing could have been more fortunate than the course taken for the sightseers in the gardens; an opening in the trees enabling them to see the balloon, as long as it was possible to see at all. The descent was made at Lisdoonan.

In this trip we looked down on two loughs. It may be noted that the elevation of Lough Neagh appeared very much greater than the other lough, or indeed than what one was led to expect. The magnificent views that we saw all around us—the fertile valley of the Lagan, with the silvery river glittering through it, and the hamlets sleeping quietly in the evening sun, formed a scene which cannot be forgotten—as one of the passengers stated.

A LECTURE ON BALLOONING.

The evening preceding our ascent I gave a lecture in the Music Hall, when the chair was occupied by A. J. Macrory, Esq. The chairman mentioned a circumstance of which he had been informed respecting the son of Mr. Glaisher, who was fourteen years of age when he ascended with us at Newcastle-on-Tyne. This intrepid youth asked his father for permission to make an ascent with him. "No, no," replied Mr. Glaisher, "the voyage is perilous, and you might lose your life." "But," responded the lad, "my dear papa, if there be danger I may lose my father, and you can lose but a son."

The son did accompany us as I have elsewhere stated. Some years afterwards he came out second Wrangler at Cambridge, and is now the President of the Royal Astronomical Society.

I cannot advert at any length to my lectures, but I ought to do so in order to be faithful in briefly mentioning the chief events of my life, two of which were when I had the honour of lecturing before His Grace the present Archbishop of Canterbury, at the time Dr. Benson was at Wellington College, and before Dr. Bradley, the Dean of Westminster, when he was Master of Marlborough College, on which latter occasion Lord Tennyson and his two sons were present. But the most amusing, and to me the most extraordinary lecture I ever delivered, was to the deaf and dumb in the Oxford Street Institution, when the late Mr. Smith translated what I said with his fingers, and produced with astonishing rapidity wondrous marks of approval and interest on the part of the audience just as

if the assembled multitude had heard every syllable I uttered.

ASCENT OF MY NEW BALLOON "RESEARCH," FROM BELFAST, 1865.

I lost no time in replacing the "Britannia" by another and much more beautiful looking balloon, it was also considerably larger, viz., 20,000 feet in excess of the "Mammoth," and the decorations alone cost an immense sum, being executed by a very clever artist named Foot.

The first ascent I made with this balloon was from York, when the Lord Mayor, the still living Mr. Alderman Wade, ascended with me, Captain Leslie and Lieutenant Westcar of the Royal Horse Guards Blue, and the ubiquitous Mr. Smith, being my companions.

It ascended from the Crystal Palace also, on a very wet day, and the same year was engaged for the Botanic Gardens, Belfast, where I ascended early in July, 1865. The ascent was a decided success, but owing to my having listened to one, out of a party of eleven, respecting a suitable place for landing, an hour had scarcely elapsed when we found that a struggle for existence was at hand, and that everything depended upon the way in which it was fought. The fight was a close one, but the wonder is that it did not end fatally for more than one of the party.

The following letter from Mr. Runge, a German, is a fairly correct version of the trip.

"To the Editor of the *Ulster Observer*.

"Sir,—So many contradictory and exaggerated reports on the late balloon ascent having appeared in the papers, and my name having been given as authority for statements

which I have not made, I conceive it my duty to state, as soon as possible, the actual facts of the occurrence. Before I proceed with the account, I must say, in justice to Mr. Coxwell, that he has behaved throughout, under very trying circumstances, in a cool and collected manner, and that it is my firm conviction that the unfortunate accident which took place, was not the consequence of his mismanagement, but occurred chiefly on account of the confusion caused by the excited interference of some of the passengers. When Mr. Coxwell proposed to descend, he gave to us the strictest instructions how to behave. He told us to sit down at the bottom of the basket, with our backs towards the wicker work, and to leave our limbs in an easy unconstrained position. He fore-warned us of the heavy knocks and bumps we should get, and told us we must not mind them, as it was a very windy day. On landing, he told us to get out *one by one*, and not to let go our hold of the car on any account, as the gas in the balloon was now comparatively exhausted, and it had but little buoyancy left. In spite of Mr. Coxwell's injunctions, some of the passengers could not be induced to sit down. When the car struck the ground, and was carried along with great violence, knocking us about severely, the excitement got intense. Some prayed aloud, others shouted to Mr. Coxwell to 'let off the gas,' others cried out, 'We are all lost' in short they behaved in the wildest manner, losing completely their self-control.

"Several of them now pulled at the valve-cord with gr eat violence, and there appeared to be a general panic. We, who sat down, obeying Mr. Coxwell's commands, were

trampled upon by the others, as if it were a struggle for life. Instead of that it was a scramble, each man for himself, the more powerful men thrusting back the weaker. Some of those getting out first abandoned their hold of the car as soon as they reached solid ground; others, amongst whom was Mr. Coxwell, held on, but were obliged to let go, when the balloon, relieved of the weight of several persons, rose again with renewed buoyancy. All this happened in but a very few moments, so that when I climbed upon the side of the basket, the balloon was at least fifteen feet high, and I was left with a single companion, Mr. Halferty.

"Mr. Coxwell and some of the passengers tried to hold on to the cable, but their strength was not adequate to the task; the anchor broke lose and off we went, rising to the height of about 1,000 feet. My companion said calmly, 'the Lord have mercy upon us, our lives are lost; we had better be resigned.' I was looking out for the valve-cord to pull the valve open, but could not find it. At length I discovered it entangled in the netting. I pulled it, but alas! it had no longer any connection with the valve. My companion, who saw me occupied with the cordage, asked me whether I understood the management of a balloon.

"'No,' I replied, 'but if I did, it would be of little avail, since the valve cord is broken.'

"About the same time I discovered that we were again falling, so I called out to my companion to cheer up, that we might yet be saved. We were gradually coming nearer the earth, and the anchor was then striking the ground from time to time. I looked out for assistance, but could discover none in the mountain wilderness we were then

careering over. At length I saw several men to whom I shouted out for help. They, however, staring with vacant gaze, stood motionless like so many statues. Onward we swept; I saw another batch of men, to whom I made the same appeal, but with a similar result. Some remained motionless; a man and a woman ran away at full speed, and one tall fellow actually dropped on his face, struck down by terror. Onward we swept; then a fearful concussion of the car—the grapnel had caught. 'Prepare for a bump' I shouted to my companion, and immediately the balloon surged down, and afterwards the car struck the ground. Mr. Halferty was pitched quite out by the violence of the shock, whilst I was thrown against the netting, and fell back again into the car. I tried to scramble through the ropes, but I was in an instant again house-high, for the balloon, relieved of the weight of Mr. Halferty, rose with renewed vigour. Mr. Halferty, although he had a heavy tumble, did not lose his self-possession, but immediately caught the cable and tried to secure it, but his poor strength was of no avail. The anchor broke loose and away I went. I did not rise high. The balloon moved on very soon in a horizontal direction, straight towards the sea, which we were then rapidly nearing, at the height of about twice the length of the mooring cable. The thought had struck me several times to try by any means to make a rent in the balloon, for although I had no knife I might have torn the silk with my teeth. I climbed up a short distance, but then it occurred to me that as soon as the gas escaped the anchor would *strike the ground* again, and I should not be able to

support the concussion while hanging in the netting, as I was suffering a good deal from the shocks I had sustained. I descended, therefore, into the car, and to my great relief found that I was gradually coming near to the earth. The anchor struck the ground several times, but never held fast, scattering about the turf and stones like feathers. I saw some men working in a field, and shouted out to them, 'for God's sake help me, or I shall be lost! secure the anchor.'

"They understood my appeal at last, but too late. Away we swept before them, the anchor ploughing up the ground several acres in length. Coming to a farm I shouted out to the people standing there, the same appeal. Some women, with their quick, humane instinct, were the first to perceive my danger, and exhorted the men to hurry to my assistance, they themselves running as fast as they could to tender what little help they might be able to give me. The anchor stuck in a willow-tree. I shouted out to the people below to secure the cable and anchor by ropes, which they did. The evening was now beautifully still, the breeze had died away, and the balloon was swinging calmly at her moorings above the farm yard. One of the men asked me whether I had a rope with me, or how I intended to get out. I told them only to take care of the cable, because the balloon would settle down herself bye-and-bye. I was congratulating myself on a speedy escape from my dangerous position. I had not counted on the wind; a breeze, in about six or eight minutes, sprung up, tossed the balloon about like a large sail. A crash—and —*the* anchor was loose again. It tore through the trees, *flinging* limbs and branches about like matches. It struck

the roof of the farmhouse, splintering the chimneys and tiles like glass. On I went; I came near another farm, shouted out for help, and told the men to secure the anchor to the *foot* of a large tree close by. The anchor was soon made fast, but this was only a momentary relief. The breeze again filled the half-empty balloon like a sail; there was a severe strain on the cable, then a dull sound, and a severe concussion of the basket; the cable, strange fatality, had broken; and the anchor, my last and only hope was gone. I was now carried on in a straight direction towards the sea, which was but a short distance ahead. The anchor being lost I gave up all hope. I sat down resigned in the car, and prepared for the end. All at once I discovered that a side current was drifting me towards the mountain, the car struck the ground, and was dashing along at a fearful rate, knocking down stone fences, and breaking everything it came in contact with in its wild career. I think I must have gone at least at the rate of ten or twelve miles an hour. Almost certain death seemed before me, yet to jump out on this passage would have ensured my being dashed to pieces on the rocky ground beneath. I was tossed about in the basket as the peas in a child's rattle, and cannot comprehend at this moment that my bones were not all broken. Bye-and-by, the knocks became less frequent; we were passing over a cultivated country, and the car was, as it were, skimming the surface and grazing the top of the hedges. I saw a thick hawthorn hedge at some distance before me, and the balloon rapidly sweeping towards it; that was my only chance—I rushed to the edge of the car, and flung myself down upon the

hedge. I expected a severe tumble, but had a mild fall. The car did not, as I feared, strike me, but the moment I left it rose over my head. I slid down gently on the other side of the hedge. I rose on my feet, and then tried every limb. They were whole, and I need not describe my feelings at this almost miraculous preservation. When I looked up I saw the balloon soaring majestically over the sea, from which I was about a quarter of a mile distant. My strength now almost forsook me, my lips were parched with thirst, and it was with pain and difficulty I was able to walk. I was almost too weak to climb over a little fence. Seeing some people at a distance, I tried to call for assistance, but my voice failed me, and I could not speak. I descended the hill slowly, and walked towards the little village of Waterfoot. As I went along I regained some strength. The good people of Waterfoot were full of kindness and sympathy, and I acknowledged their good tact, as, instead of importuning me by too much curiosity, they left me quietly to repose. Whilst I was lying up stairs on a sofa, a gentleman from Ballymena inquired for me, and kindly offered me a seat on his car and a bed in his house. I rode on with him to Ballymena, where I arrived at midnight. I was most hospitably received by Mr. and Mrs. Patterson. It was there that I met also my late companion, Mr. Halferty, who had heard of my rescue and came to inquire after me. Altogether my solitary and not uneventful journey through the air occupied I think, about three quarters of an hour, and the distance I travelled cannot have been less than ten miles.

"I am, sir, your obedient servant,

"JOHN HENRY RUSGE."

"GREENOCK, *July 5th.*—A message has been received this morning from the chief coast officer at Bowmore, Islay, intimating that a balloon was found on Laggan shore early yesterday morning, in which were four top-coats and two hats, filled with sand; also, a piece of a newspaper, headed *Northern Whig*, Belfast, 1st inst. No person was found in the vicinity."

Mr. Runge's description of the way in which the last two passengers re-ascended is not exactly correct.

It was just at the moment when they were down and being trodden upon, that I gave the order for all hands to jump out while the balloon was dragging over the ground. I quite thought that I was the last to spring when the "Research" very slowly went up, which I could have prevented if the valve line had not been pulled down by two or three persons tugging at it—no wonder it gave way—our escape was indeed astonishing, and Mr. Runge's was something more, it was clearly throughout a Providential rescue, the iron-bound coast and a boiling sea being at hand and our pace being faster than described.

I had the "Research" back from Scotland in many pieces, and ascended with it after elaborate repairs were executed, but I should not have decided upon carrying these out save for the circumstances under which the balloon was paid for by subscriptions from Leicester and London, as well as Belfast and elsewhere.

CHAPTER XIII.

WAR BALLOONS AND A NEW METHOD OF FILLING THEM.

VERY important are the interesting experiments in this direction, which took place at Fürstenwalde, in the presence of Colonel Swaine, C.B., and the chief of the Balloon Department of the Prussian army. They suggest at the present moment a retrospective glance at this subject, as the English aëronauts are not, I should say, far in advance of their Continental rivals; it is, perhaps, doubtful when we read of this new method of producing gas, whether English aëronauts are not behind the Germans, so that it becomes a question whether we have not devoted too much time and attention to the revival of old plans instead of inventing new methods.

It appears to me that if we refer to one noteworthy application of the balloon in warfare, we shall perceive that, so far as a really useful survey goes, we have not progressed much; certainly we have not surpassed, even if we have equalled, the exploit to which I will refer.

I have been looking over an article which appeared more than a quarter of a century since, and which shows that on the field of battle one of the old school of balloonists rendered more service to the state and to the army employing his balloon, than any modern discoverer whom *I can call* to mind.

INFLATION OF A WAR BALLOON. [*To face p.* 248.

It may not be uninteresting to allude to the event, as it is of historical value.

After the Austrians had crossed the Mincio with their whole force, and then re-crossed it with 200,000 men, they fixed the contemplated surprise of the enemy at nine o'clock in the morning.

"The Emperor of the French," said *The Times*, "representing the juvenile irregular force, refused to be surprised; he sent a man up in a balloon, and, at the expense of a few yards of silk and a few square feet of gas, is told the exact position of all those masses which are drawn up so scientifically out of his sight with the intention of surprising him at the comfortable, leisurely hour of nine a.m.

"Napoleon III. attacks at daybreak, chooses his own time, and remains master of the field."

The civilian aëronaut was M. Godard, but whether that balloonist was liberally paid for his useful services, I am not able to say.

It is not very long since that the Italians figured most creditably with a British bullock-skin balloon in Abyssinia, and had a really useful survey of their opponents.

Most galling must such deeds as these appear to John Bull. We can imagine him pointing to Alexandria and Tel-el-Kebir, enquiring as to the absence of balloons, and asking about the work accomplished at Suakim.

It is true that at the Red Sea littoral, balloons ascended, and the gas was conveyed from Chatham; that was excellent work, but the wind has since been taken out of our *sails, and the Italians* know quite as much, for less con-

sideration probably, and they have operated further south with British manufactured balloons, which brings us to inquire who really first invented this style of balloon.

I have shown in the first volume of my experiences that large and small skin balloons were made in London more than fifty years ago, and I can vouch for it that Weinling, senior, made two cigar-shaped skin balloons for me in the year 1860, and that the original balloon imparted the principle which was explained more fully later on by the maker.

The two skin balloons which the elder Weinling made for me were precisely similar in size, but not in substance or appearance. One of these balloons was much stouter than the other, and was put together on a different principle. I found after careful examination that it was the keystone to the arch, and that it revealed one of the secrets as to how skin balloons were made; this plan was, I found, essentially different to the way in which silk or cloth balloons are constructed.

How I came to obtain this original production was in this wise:—I had been exhibiting a model made by Weinling, which I was about to direct and steer in the Crystal Palace; the machinery part of this balloon, with the screw propellers, were designed by a Mr. Steward, an ingenious amateur aëronaut, and some time afterwards I required a duplicate balloon for lectures, and one that was, if possible, tighter, as the slightest escape of gas would not do in a limited space where ladies would be present, so that I said "never mind appearances; what I want is a gas-tight elongated balloon, 13 feet long by

nearly four in diameter; in fact, the size of the one you have supplied me with as near as can be."

"If that be the case," said Weinling, "just come along with me to Mr. Herron, the dealer in toys and skin balloons at the Crystal Palace," and there I was shown one apparently of the same size, but it was dusty and had been placed on one side in a drawer.

Well, this was more of the bladder or bullock-skin substance, and I asked if I could have that.

"Yes," was the reply, "but I should have to pay double for it." I took it, however, at his own valuation, and when I came to examine it minutely, I discovered the plan of its construction.

Of course, I am not going to disclose what very little, probably, I know about the making of skin balloons, but that there are secrets connected with their manufacture, I feel certain, and from what I was informed of the process of preparing and uniting the skin, I have no doubt but that considerable skill is required, not only in commencing, but in completing this kind of material.

The Prime Minister, in his reply to Lord Wolseley's remarkable speech in the House of Lords, used these encouraging words:—"We are deeply sensible of the debt we owe to experts, and how carefully we should consult and weigh their opinions."

In ballooning there are not very many persons who are entitled to be considered experts, while on the other hand there are several who have resuscitated original ideas which have been for a time obscured or lost, so far as *public recollection* goes.

The plan of using compressed gas is not wholly novel Medical men and others who have used for many years the Nitrous oxide gas, condensed in portable iron cylinders, must be aware of this, and those who have seen how coal gas is pressed into receivers for use in the underground railway trains, must know that a first principle, and the practical application thereof, are totally different things altogether.

I have no desire to detract from the merit of conveying gas to distant parts in this fashion, although the German aëronauts consider that it is unsafe, owing to the effects of sudden changes of temperature.

Dr. Majert, the distinguished chemist, and Lieutenant Richter, have produced on the spot, in a more simple and much quicker way, the required inflating power, to be had from an apparatus which can go wherever a field gun can be dragged, and it will be forthcoming two hours after a certain heating process is set to work in what is called the *Entwickler*, which has, above a furnace, several parallel layers of retorts, into which are thrust cases like railway carriage warmers, filled with *a mixture of zinc dust and hydrate of lime*, which is speedily converted into hydrogen gas.

Should this answer, it will simplify and expedite the process of filling.

The most recent news in reference to the conveyance of hydrogen gas in tubes, appeared in *Galignani's Messenger* of May 24th, and is the first intimation I have had of a war balloon being filled in England by civilian hands after the method adopted by our military aëronauts. The

paragraph is to the following effect:—"The war balloon 'Rookwood' made an ascent from Swansea racecourse recently; after crossing the Bristol Channel safely, it landed at Simonsbath in Somersetshire. An air current at first carried it inland, but ultimately it returned. The balloon was inflated with pure hydrogen gas from tubes which had been charged at Birmingham and conveyed to Swansea." Professor Baldwin informed me that he has used hydrogen sent from Birmingham.

* * * * * *

Since these remarks were penned, poor Mr. Joseph Simmons met with a terrible disaster at Ulting, near Maldon, in Essex, on August 27th, which unfortunately terminated in his death. This daring and experienced aëronaut had with him in his wirework car Mr. W. L. Field, a photographer from Brighton, and Mr. Miers, of the Natural History Museum, South Kensington. These gentlemen were both injured, and it is much to be feared that the entire structure of the balloon "Cosmo" was of a weak and imperfect character. The netting, it was said, appeared to be too thin, and the meshes too large, they were not sufficiently numerous for a balloon of 63,000 cubic feet capacity. Then the valve was so small that the gas did not escape quick enough after the machine became anchored in a tree; when at last the network gave way the balloon itself broke through, and the wire or chainwork car, together with an iron hoop, fell heavily to the ground; had it been made of cane and wicker, the aëronaut and his passengers might not have been seriously injured. Mr. *Simmons had* crossed the Channel with Sir Claude de

Crespigny, and with other passengers, several times during the last few years of his career.

A PRESENTATION.

An illuminated address from the Committee of the York Gala, was presented to me at the luncheon in the year 1882, the following is a copy :—

"Dear Sir,—The Committee of the Grand Yorkshire Gala in meeting you on this, the twenty-fourth anniversary of your balloon ascents from the ancient City of York, desire respectfully to offer for your acceptance this permanent regard for your personal character, and of the high estimation in which they hold your professional services, not only as adding to the pleasure of the many thousands who have witnessed from the grounds in which we are now assembled, but in promoting the interests of scientific research, as attested by your memorable ascents with Mr. Glaisher, and other occasions of the highest scientific value and importance.

"During the many years you have been associated with the Grand Yorkshire Gala, *you have never disappointed us*, and for this we feel that we owe to you our heartiest and especial thanks. We earnestly trust that this Association may yet be long continued, and that it may please God to bless the declining years of your life with all the solace and happiness which you could for yourself desire to enjoy.

"Signed on behalf of the Committee :—JOSEPH TERRY (*Chairman*), EDWARD ROOKE (*Vice-Chairman*), JOSEPH WILKINSON (*Treasurer*), JOHN WILSON (Secretary)."

FORMING A GERMAN BALLOON CORPS.

In the summer of 1870 Mr. S. J. Mackie, C.E., who was well acquainted with scientific ballooning, called on me to ask if I would go to Cologne with two of my balloons for the purpose of raising a detachment of military aëronauts. I accepted the offer, and found that an American balloonist had also been engaged for a similar object, but this gentleman's services were to be devoted to experiments of a tentative character with his fire balloon, while my endeavours, as may be presumed, were confined to the principles and practice of ascents with gas balloons.

We were each appointed to separate stations at two of the government gasworks, situate some distance apart, but as the Montgolfier plan, which was simply dependent upon heated air, did not succeed, the fire balloon was then transformed into a gas balloon; the time, however, occupied in accomplishing this work so delayed the proceedings that this part of the programme was abandoned, and I had to proceed with my assistant, Mr. Barker, to carry out a series of captive ascents. These were satisfactory to the commanding officer, who frequently issued his orders to inflate and go up, notwithstanding fresh winds, so that the various tests were at times no child's play; but as I was accredited as an experienced instructor, the officers were ever ready to face all dangers, and they acquired information in a proper, legitimate way, instead of picking it up from outsiders, and trusting to their own performances without competent teaching.

During one of these ascents I saw the train pass which

contained the Emperor Napoleon, who was proceeding, after the battle of Sedan, on his way to captivity.

In Cologne, where I had previously ascended in the year 1848, I met an old friend who knew Mr. Abraham Küpper of Elberfeld, this was no other than Herr Director Pepys, of the town gasworks, an influential personage, and well known to the commandant and the authorities; through the kind attention of my countryman, Mr. Pepys, who was a typical Englishman, we got over many difficulties as to going up in stormy weather, the risks of so doing being fully explained in a way which proved convincing and satisfactory.

As my balloons were disposed of to the German Government, I returned to England to fulfil engagements and to replace those which had been sold; my assistant, Mr. Barker, on the other hand, went to Strasburg with the newly-formed corps, and one balloon was used, but owing to the capitulation the services of my representative were not further needed.

The instructions I had given, however, were not lost, as may be gathered from the present efficiency of the Prussian Military Aëronauts, who have now their own entirely new system of generating gas on the spot, and who do not imitate other nations, but invent for themselves.

A FRENCH AERONAUT AND HIS WIFE AT SEA.

In the year 1874, M. Duruof set out from Calais on August 31st, with the intention of crossing the sea to England. The weather was not favourable for the undertaking, but the aëronaut had been taunted with cowardice, and this naturally offended both M. Duruof and his wife,

who were at their hotel, and they left the table abruptly, saying that they would show the people of Calais that they were not afraid to die. The car was hastily attached to their balloon and they ascended at 7 p.m., with only a few bags of sand, and were soon out of sight over the Channel. They drifted about all night, and in the morning were over the North Sea. They had been ten hours in the air, and were two hours dragging through the water. At last the captain and mate of the smack "Grand Charge," reached them, and they were rescued, but the balloon sped away towards Norway. In London, and, indeed, throughout the United Kingdom, great sympathy was evinced towards the Duruofs, and I was glad myself to offer them the use of one of my balloons to enable them to ascend from the Crystal Palace, where several passengers paid well for accompanying them in their trip. I took care that this sum should be added to their other receipts, and altogether they did fairly well before returning to Paris.

I had also the pleasure of making a collection for the brave fishermen who saved them from a watery grave, and of forwarding to the Mayor of Great Grimsby a considerable sum for their benefit. The late Colonel Burnaby was one of those who ascended from Sydenham on the occasion, and was delighted thus to contribute towards the restoration of the lost balloon.

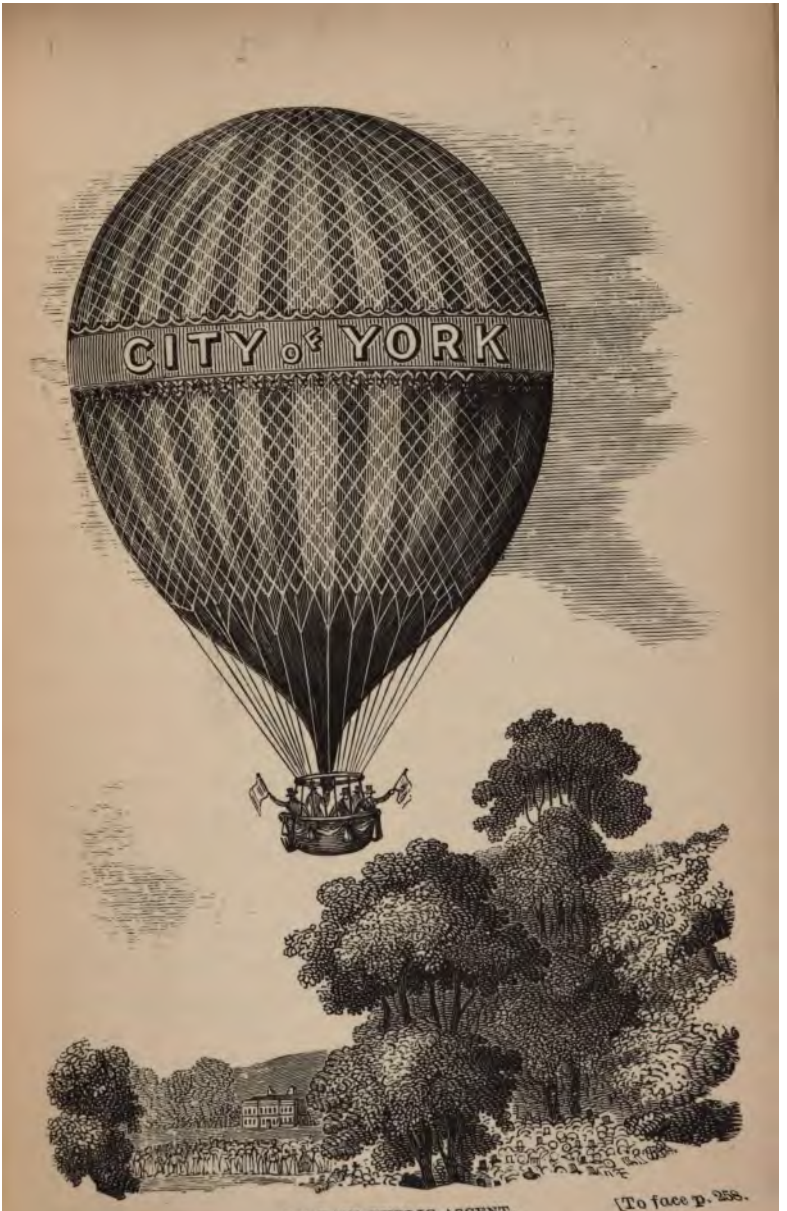
MY LAST PUBLIC ASCENT.

In many respects this was one of the most singular of my experiences. It was made on June 17th, 1885, the eve of Waterloo day. About this time there was a railway *accident not far off,* and an earthquake shock, which was felt

in York, so that the "omen" party were considerately tendering warnings to "mind what I was about"; and these occurrences might have kept back some of the more superstitious from attempting to explore the skies, but to me they afforded an opportunity of conspicuously illustrating the safety of aërial voyages when compared with terrestrial journeys under difficulties.

The *York Herald* stated that, "Distinct shocks of earthquake were felt at Pontefract, Knottingley and Ferry Bridge, at the latter place the inhabitants were running out of their dwellings in fear, articles even falling from shelves, and walls rocking for a brief period. The shock was felt at York and other places, and there was also the railway accident not far from the Gala grounds, so that those who journeyed a moderate distance from the earth's surface in a balloon, were probably in less actual danger than many who considered themselves perfectly safe below." Whether this idea created any fear as to the seismic wave causing fresh rolling of crockery, and of other chattels being materially damaged, I cannot say, but the candidates for a journey aloft were very numerous during the fête, which lasted three days.

I myself, ascended on the first day, and the following gentlemen accompanied me,—Major Allenby, Brinkworth; Mr. W. Coates, Helperby; Messrs. Armstrong and W. Heslop; I forget whether Mr. George Browne and Mr. Cooper ascended on that day or on the following. The Minster bells rang out a merry peal as we started, and one of the military bands struck up the tune inseparable from a balloon ascent, "Off she goes," and had I assumed a



MY LAST PUBLIC ASCENT. [To face p. 258.

little of that audacity which is so frequently met with in these latter days, by pretending to be a steering aëronaut, such an attempt would have passed muster, for it is a fact that the balloon made very nearly a circuit of the York suburbs, owing to a cyclonic movement of the atmosphere, and this enabled the "City of York" balloon to perform a stately and ceremonious farewell greeting, which was admirably suited to the occasion.

Next day, and the evening following, Mr. Thomas Wright, the well-known Crystal Palace aëronaut, became my deputy, and acquitted himself in first-rate style. That gentleman had kindly and efficiently assisted me on some previous occasions, taking charge of my balloon, and commending himself to the committee and to the visitors no less than to the aërial voyagers, by his straightforward conduct; he has since become a regular yearly attendant with balloons of his own, at the York Gala, and is ably supported by his friends Mr. Lewis Hammett and Mr. Dale, who have both had considerable experience in ballooning; so that with their united efforts this feature of the entertainment is not likely to fall into the hands of those who are incompetent, or who have not deserved to succeed as Mr. Wright has done, both as regards his dealings with me and the Directors of the Gala.

APPENDIX.

CROSSING THE ATLANTIC WITH A BALLOON.

THE first proposal to undertake this daring feat was made by Mr. C. Green in the year 1840, and his scheme, as outlined on paper, contained a reasonable amount of forethought and calculation.

The experienced aëronaut expressed himself ready to give his services gratuitously, if there should be found among the wealthy patrons of his art persons sufficiently disposed to favour the attempt. But such were not forthcoming in his day and generation, so that Mr. Green finished his vocation by journeying overland, and died a natural death in his bed.

That an expedition of this character would prove costly has, since the veteran's time, been practically ascertained by enterprising men in America and France, who have actually prepared equipments, without, however, up to the present time, having committed their aëronauts to the real oceanic test, so that it is, after all, a matter as yet of mere theory, and the respective aspirants have not entered upon any preliminary flights over great stretches of sea (say one sixth of the breadth of the Atlantic from New

York to Ireland), so that their confidence must be great or they never would risk their reputations and subject themselves to the shafts of ridicule, which are almost sure to pursue and be the fate of those who seriously pledge themselves to do a certain kind of deed, and then either break down in trying to carry it out, or, what is infinitely more stupid and ignoble, never seriously attempt it.

At present, therefore, owing to the absence of any noteworthy or reliable start over the broad waters of the Atlantic, we can only read, mark, and meditate about the programme offered for inspection, and by comparison, together with the exercise of common sense, judge which, all things considered, is the best and safest plan—if safety be in any way an admissible term for work which, by a general consensus of opinion is allowed to be extremely uncertain and perilous.

Although Mr. Green's plan was never tried, it deserves, from an aëronautic point of view, to stand in the front rank, because it takes into consideration the different atmospheric changes and conditions which would be most likely to present themselves, and also because we get in figures the effects of expansion in proportion to the elevation attained, and these correspond with inches in barometrical measurement, which will astonish many persons, and some few aëronauts probably, who little suspect what an impoverishment of the gas goes on from the time a balloon leaves the earth, not only from leakage, but from large volumes which are forced out of the safety valve owing to diminished pressure of the air, and quickly *too, as the balloon* rises into space.

This most important factor clearly demonstrates that if the balloon mounts very high, with the idea of rising into that zone of air which is presumed to blow in the desired direction, the loss of gas will be something enormous even at the outset of the voyage, in order to obtain a favourable place in the eastern current.

Allowing that Mr. Green's computations are correct, it is most desirable to remember that when a balloon, say of 80,000 cubic feet capacity gets 3000 feet high, it loses 8000 feet of its gaseous contents, an enormous percentage even supposing it was fully charged at starting; this result is in consequence of three inches of pressure being removed, a condition of things which demands an equivalent of 288 pounds of ballast by way of compensation, so that if excessive elevation is to be attained on a long trip, the stock of gas is seriously impaired by the primary effort to seek a suitable current, and as a balloon must rise higher and higher every fresh curve it makes, the exhaustive process must go on with sure and rapid strides, so that the life of a balloon, so to speak, cannot be of long duration unless some such plan as that proposed by Mr. Green is adopted to obviate the necessity of going very high.

Across the hoop to which the netting is secured, and from which the car is suspended, he intended to have a windlass to haul in or let out a rope of 2000 feet in length, and to the lower extremity of this a number of small waterproof canvas bags were to be attached, with their apertures kept open by means of small rings of suitable material fixed in such a manner that when drawn through

the water the entrance of the fluid would be free, but its return would be impossible; between these, and at stated distances, a number of small conical copper floats were to be disposed so as to serve the purpose of supporting the length of the rope when it reached the water in consequence of the depression of the balloon. When the lower portion of this rope descended, it would rest on the surface of the sea, owing to the buoyancy of the floats, and would lighten the balloon of its weight, and still keep it from rising very high in the event of a slightly varying distance from the water, caused by change of temperature.

As to how long this recovery of position would be maintained is another question, depending upon the condition of the balloon, and the state of wind and weather, which might interfere with such delicate contrivances, especially if it came on to blow hard, when these fragile, but ingeniously conceived, machines might prove of little use, and the aëronauts might meet with the fate of M. L'hoste and his companion, M. Mangot, or of the Belgian military aëronauts in their recent attempt to cross the Channel, although their balloon was not lost in the angry waters before they could be rescued.

This regrettable disaster showed that appliances which are all very well in theory, and which may do in the air, are utterly useless when brought in contact with the rough sea.

As Mr. Green's plan was never tried, it is impossible to say how it would have succeeded; in a moderately still air current it's action might perhaps have been in accordance with his expectation, but in such a wind as would appear

to be requisite for crossing the Atlantic, I should entertain doubts as to any satisfactory result.

Having explained the means suggested for preserving the ascensive power of his balloon, it now remains to allude to the direction of her course. To govern this Mr. Green did not propose the use of any kind of steering apparatus or propelling power, he relied upon taking advantage of the natural currents of air which, according to his own observations, and those of nautical men, skilled in the investigation of the meteorology of the Atlantic Ocean, justified him in depending upon an air current sufficiently favourable for the purpose.

He believed that there were two distinct classes of currents—one that governs the motion of the atmosphere in its higher region, and the other which produced the strata more immediately contiguous to the surface of the earth and the sea; he had always noticed uniformity of the wind at a certain elevation, varying occasionally, but always within 10,000 feet of the earth, blowing from the west, or rather from the north-west, and though he did not assert—and this is most important for M. Jovis to remember—that such must be the case over all portions of the terraqueous globe, yet he thought that a condition not very dissimilar may characterise the more elevated regions throughout their whole circuit.

That there are seasons when the wind blows from certain quarters long experience has distinctly proved; but it does not always happen, as we know by the deviation of the storms which have had a definite route forecast, and which after all change to an extent sufficient to upset the

sanguine hopes of those who rely upon unswerving accuracy in a tolerably direct line, and may not prevail to bring a balloon towards the shores of Great Britain.

Mr. Green suggested a water drag to check the speed of the balloon should the wind change, and a number of imitators have fathered this as well as many other devices, but how the canvas drag would act in a heavy sea, and what the behaviour of the balloon would be under such circumstances we cannot yet determine from trials on the Atlantic waves.

Green furnished his imitators with the excellent idea of starting from the American instead of the English or French side, the air currents being more constant and reliable from New York to Europe, than from our country to the American Continent.

After his declared readiness to attempt the voyage, there followed, in the year 1873, a counterblast from over the water which was equally, if not more pretentious, though it came from men who were far less entitled to notice than the British champion balloonist. At first, one Donaldson, an actor, who had turned aëronaut, endeavoured, about fifteen years since, to procure means in Boston, U. S., to enable him to cross the Atlantic in a balloon: he failed in this, but his effort attracted the attention of the managers of *The Daily Graphic*, who soon after contracted with him and Mr. Wise, a better known and more scientific man, to make the experiment. The *Graphic* people, we are told by Mr. S. A. King, himself a well known aëronaut, undoubtedly, went into the undertaking in good faith. They were led to believe in the existence of a constant easterly air

current, and were mistaken in believing it possible to maintain a balloon long enough to make the voyage successful. They placed at the disposal of Wise and Donaldson more than the amount stipulated for, as necessary to construct the apparatus, and every requisite was provided. The balloon was constructed and despatched from Brooklyn in a strong gale setting directly oceanward, but Wise had declined to go as expected, and Donaldson ascended, accompanied by two representatives of the *Graphic*. The balloon rose to the height of a mile, but over the eastern extremity of Long Island, it encountered a storm moving northward, and it finally descended in New Canaan, Connecticut. The boat they carried on this trip weighed nearly two tons.

Mr. King, the American aëronaut, whose interesting book gives particulars of his proceedings, succeeded in inflating the huge *Graphic* balloon, and Donaldson possessed the courage, but not the judgement for such an experience, or he might have succeeded, it was thought, in making a voyage of at least a thousand miles by sea instead of five hundred over land.

The *Graphic* held an enormous amount of gas, and in addition to the passengers, and a most ample store of provisions, clothing, and other accessories, carried the sea-worthy boat already mentioned. She was despatched in a gale of wind blowing due east on the morning of October 6th, 1873, and had she been in charge of a more skilful navigator, would have made a much longer voyage.

On a later occasion, June 23rd, 1875, Donaldson ascended with a smaller balloon, taking with him three reporters.

They were carried out over Lake Ontario, and finally through loss of gas, descended to the water, through which they were dragged, clinging to the ropes for many miles, and were finally picked up by a small boat from a passing schooner.

The death of Donaldson in a lake on July 15th, 1875, is an impressive commentary on the perils of a transatlantic voyage, and may have an instructive bearing on the subject under consideration; he had ascended from the Hippodrome, Chicago, at 5 p.m., and was accompanied by Newton S. Grimwood, of the Chicago *Evening Journal*, who had disputed with another reporter for a seat, and whose fatal lot was decided by the toss of a coin. The balloon held 83,000 cubic feet, and departed with about 800 pounds of ballast. It rose to the height of a mile and floated to the north-east, over the lake, at the rate of fifteen miles an hour. At 7 p.m., the *Little Guide*, a small craft, sighted the balloon; it was then occasionally dipping its basket in the lake, only a mile and a half away. The schooner headed for it, but before it could overtake it, there seemed to be a sudden lightening of the car, and the balloon shot upwards to a great height and soon disappeared. This was the last ever seen of it. That night a terrific storm swept down upon the lake. How the two men met their fate was never known, but on the 16th of August, the body of Grimwood was found on the east shore of Lake Michigan, near Stony Creek, and it was fully identified; his boots and hat were missing, and around the body was a broken life preserver. Of Donaldson and the balloon no trace has *ever been discovered*.

In the year 1878-9, Mr. S. A. King was instrumental in forming an Aëronautical Society, and during the winter, the whole field of aëronautics was carefully explored with a view of ascertaining the most feasible plan of proceeding on a transatlantic voyage in a balloon of his own construction. An Association was formed to enable him to enter upon the execution of his plans. The *New York Herald* editorially commented as follows.

"The hitherto insuperable difficulty of sustaining a balloon at a great altitude against the loss of lifting power by leakage, the increase of weight by absorption of atmospheric moisture, by contraction at low temperatures, gradual loss of ballast, and so forth, Mr. King claims to have overcome. Having thus, as he believes, secured his ability to keep up, he proposes, in due season, to attempt to cross the Atlantic in the air. Certainly, Mr. King has solved a very important factor if he can keep his balloon afloat for a month at a time. It is significant of the hand-in-hand march of science, that this aëronaut deduces, from the continued successes of the *Herald* in predicting the arrival of storms on the European coasts, the certainty of traversing the Atlantic on the same aërial path as those atmospheric disturbances. What directs the storm will direct the balloon, since the balloon is the slave of the wind.

"A discovery like that, now so fully tested, of forecasting the path of storms, continually opens up still greater possibilities, and the establishment of aërial communication with Europe, fantastic as the thought has appeared to the thoughtless, is one that may well possess

a fascination for the pioneers of science. We shall watch the growth of his project with lively interest."

After making the most elaborate preparations some hitch must have occurred about the start, as I have never yet heard that it was made, so that King in the New World, and Green in the Old, besides Donaldson, Wise and others, have acted as pioneers in designing different modes of ballooning the Atlantic, and now it appears Captain Jovis has come forward with his own peculiar and special design, "to do the thing or perish in the attempt;" and when a practical man, who is no novice in the upper regions, and who has given proof of not being afraid to face the sea, proclaims his intention positively to cross, it fully entitles his solemn pledge to careful attention, although it is devoutly hoped that the literal execution of his plan will not only be delayed to the fall of the year, but that many succeeding falls may pass away ere the intrepid Frenchman and his five companions venture well out upon the Atlantic.

Some points of resemblance to the American manifesto may be seen in Captain Jovis' composition, which has little of the style and caution of Green about it. Thus we notice a "life-boat in the rigging," which is essentially *nautical*, though in opposition to everything *aëronautical*. Then a car on a novel principal has a ring of Nadar about it, when he resolved to build one like a house or cottage. This car of the sea captain's is not to be round, as they generally have them in France, but "roughly square," and divided horizontally by "a wooden deck," above which *will rise a* quarter deck, and beneath these will be two or

three little berths, and the bottom of the car below the deck will serve as a hold for stowing away ballast, though most aëronauts find it necessary to have ballast close at hand and ready for use. The quarter-deck and deck are connected by a ladder, above them is a *rope ladder* leading to a third deck of *netting*, and beyond to the balloon itself.

"And suppose you lose your fins," asked the interviewer, as if he thought there was something extremely fishy about the descriptive outline.

"We are not done for then," cried M. Jovis, "for here fastened to the back of the quarter-deck by davits, hangs a tiny lifeboat fitted with oars, sails, and a compass."

The Captain was invited to declare himself still further in his own interesting way, the reporter wanted information about the wind that would be depended upon for the voyage.

"How shall I cross?" "In one of your *Herald* storms," was the reply to the representative of the famous New York newspaper. "I expect to make seventy miles an hour and to land somewhere in Norway or Sweden, three, or three and a half, days later, unless I can manage to touch *terra firma* in Ireland.

Evidently in the exercise of a fertile imagination M. Jovis was well up in the supposed two mile high current, and seemed ethereally to be bowling along at the rate of countless knots, and vividly indulging in an aërial dream which would land him just where his inclinations tended. These charming and almost seductive airy wanderings might well bring the scientist M. Faye, Member of the Institute, to utter a protest as a warning.

That gentleman explained, "that by going up into the lofty regions of the *cirri*, the balloonists might chance to catch one of the currents in which the storms are formed, which traverse the Atlantic between America and Europe. He, however, pointed out that these currents go very slowly at first, and do not acquire velocity until they reach twenty or thirty-five degrees of north latitude. The journey therefore, supposing that it could be accomplished at all, would take *from ten to twelve days*, instead of three-and-a-half.

"Moreover the currents do not go directly towards the northern parts of Europe. After the parallel of ten degrees, they proceed slowly towards the West, but at thirty or thirty-five degrees they go straight towards the North, according to the season, then incline towards the East, and finally branch off to the North-east. The storms and cyclones which are formed in these lofty regions would be fraught with terrible peril to the balloonist."

This protest does not appear to have discouraged M. Jovis and his party; but there may yet be one more potent drawback, so far as regards the sinews of war, or the 200,000 francs needed to complete the extraordinary preparations. A balloon of 750,000 cubic feet capacity, even if made of double cotton, costs a large sum, to say nothing of the net-work, fantastic car, wonderful valve, and unequalled varnishes, all of which will swallow up a vast amount. In this country the cost has arrested the progress of all colossal attempts, and expenditure for such objects, and to such an extent, would never be forthcoming in England; but it is truly astonishing how balloon enterprises are *supported in countries less rich than ours*. Green, a trust-

worthy man when once the cash was placed before him, never met with encouragement for a transatlantic voyage, in all probability he would not have made the trip to Nassau in the year 1836, had it not been for Mr. Robert Holland, M.P., who fitted out and originated the expedition.

The Provençal Captain seems to be generously patronised in the pecuniary part of the business, and to have the confidence of volunteers ready to place their lives at his disposal, and if he errs in his calculations, they, like the leader, will have to risk the consequences.

It is devoutly to be hoped that the life-boat will be in good trim, and that she will right herself in whatever form (head or tail) she takes the water, and that the last connecting link—the let-go line—will be simply arranged, for if once this ponderous mass makes a plunge with a seventy mile an hour wind, all hands will have to be prepared for a rough time of it when the boat reaches the water.

But is it not possible for dauntless air travellers to succeed? Or could success be attained by resorting to other and less cumbrous accompaniments?

These are questions which have been put as an appeal to my private opinion, and I do not consider that it is altogether right to withhold my views. I shall, however, broach them guardedly, lest I might, to ever so small an extent, cast an encouraging glance where a serious frown would be a more kindly act to any person wishing to run such great risks, not purely for the benefit of science, or even the advancement of ballooning, but for fame without the more ennobling motives which should stir the *energies* of practical aëronauts into that kind of activity

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NADAR'S IDEAS. [*To face p.* 273.

which cannot be very well disapproved of, that is, unless people set their faces against any and every kind of atmospheric investigation and experiment.

If there is, in ballooning, one striking feature more than another that I have observed with regret during the last thirty years it is the number of gigantic machines which have been constructed, more especially in France and America. These appear to have been designed and employed solely for vain-glorious and mere exhibitive objects, without at any period of their career having been used for meteorological, military, or navigating purposes. There was the great captive balloon in Paris, which might have done useful work by ascending for military objects by day during the Franco-German war—well, what did they do—or rather what did they forget—while engaged in a pleasurable daily sight-seeing? It is said that no less a sum than £40,000 was expended over that magnificent structure, which, had it been kept for the purpose of reconnoitring and signalling when the Prussian girdle was closing in upon the devoted capital, might have proved a more profitable and useful machine than it did.

Before this M. Nadar, a great and popular figure in his way, was engaged in trying to solve the problem of flight, and conspicuously praiseworthy were his efforts—but what was the final outcome of his labours, and what was the end of his great balloon, which, so far as size went, was equal to the greatest of undertakings?

Then in America, as I have described in this volume, there was the monster balloon *Graphic*; what did she do *in the cause of* science? Or the huge captive balloon

Battersea, which broke away, and like the rest I have referred to, never left any indelible mark on the annals of science; and these, like some of the Atlantic-crossing balloons which have posed for public approbation, never were known, and indeed never attempted to be mixed up, so far as I can remember, with one useful or scientific undertaking, but their reputation rested entirely upon their proportions, their appearance, and their capacity for administering pleasure and gratifying curiosity.

Now if it could be shown that crossing the Atlantic in a balloon, or the hazardous trial of skill and endurance in so doing, was likely to prove of service to the state or to any branch of modern art, then there might be some excuse for seeking to enlist the sympathies of the public in its behalf. Suppose that Khartoum in General Gordon's time had been separated by a great gulf of water, and that he could have been ballooned away homewards through the instrumentality of an ascent just while the British army was within touch of that great and doomed man—do you suppose that the balloonists would have met with discouragement on the ground of risk to themselves? Why I do not believe that even Mr. Gladstone himself would have objected to save such a precious life even by means opposed to military etiquette, or would have pleaded that the general had better be left to his fate.

The reader will at once perceive what kind of thoughts pass through my mind, and I will further simplify and yet emphasize them by saying, that if an attempt to cross the Atlantic had been brought to the fore-front, say seven or eight and twenty years since, before the first cable message

NADAR'S SCREW AIR SHIP. [*To face p.* 274.

from America had been sent, and while that country was in the throes of civil war, and, to pursue the thought, supposing that some patriot warrior, or man of science had, during these eventful times, come to London to seek aid from the old country, there would have been some reasonable ground or excuse for crossing in a balloon in spite of all protest and peril; and had such an attempt been made, I for one, would have identified myself in some way or other, with such a public-spirited, patriotic voyager.

In the year 1871, when so many Parisians fed upon hard fare and even rats, I was asked by certain influential persons to co-operate in trying to get into Paris, letters, &c., for the inhabitants. I was on the point of taking out some balloons to endeavour (in conjunction with two French aëronauts), to start from Lille and other places outside the German army, to be in readiness when the wind set fair for Paris. The balloon would then travel on an air-path sixty miles long by three or four miles broad, allowing the latter for the diameter of Paris; and if the hit or miss trial had failed, then another sixty miles, so as to clear the German army on the other side of the capital. The total distance would thus not have exceeded 120 miles altogether, and this would not have presented an insurmountable obstacle, even if a spice of danger had been encountered, such as would have been justifiable for the purpose of helping the distressed, or the promotion and interests of science. The capitulation, however, stopped this novel departure in aëronautics, but I mention the matter as an illustration to my argument.

As an aëronaut, I have reviewed the schemes of three

practical men, and I have not disguised the dangers which would appear to be inseparable from lengthened voyages. If the question were put to me as to whether I should be surprised to hear that a balloon had crossed the Atlantic, I should say, "Yes, I am surprised," but I never held it to be impossible, and never stated as much, and I will mention why I have shown that aërial voyages, both in height and extent, depend upon the state of the atmosphere at the time they are undertaken. One day it is possible to go 100 miles with a moderate expenditure of ballast, and no very great loss of gas, but on the next occasion, to accomplish a like distance, three or four times the amount of gas and sand may be necessary; and so it is as regards height, for thick clouds, excessive moisture, with occasional bursts of sunshine may vary and alter the chances of success; but I fail to see, so far as the declared intentions of M. Jovis go, that the real and probable difficulties are thoroughly grasped. If with a balloon of over 800,000 feet capacity, and a lifting power of 59,400 pounds he meets with moderate winds, fine weather, and pursues, what I should briefly term, the tactics of an aëronautic expert, then I should not be surprised to hear that he had kept jogging along and touched land, but if he selects a storm to start in, and disregards other disturbing influences, the effects of which he may not have foreseen, then his journey may not be half way across the ocean; it all depends on the *modus operandi*, as well as the gas used, and the tightness of his balloon.

General Brine, in a lecture he gave after Sir Claude de Crespigny had preceded him in crossing the English

Channel, stated that, "of the twenty-three aërial travellers in thirteen different balloons connected with these trips, five were lost or killed ballooning, one (Colonel Burnaby) was killed in action, seven were picked up by vessels, and nine are still living, including Mr. Monck Mason, born in 1803, and himself."

This is not a very flattering report for the serious perusal of one who meditates a voyage of over 3,000 miles. Green's trip from Vauxhall Gardens, when he and Monck Mason regarded the Channel as a mere river, and swept over it almost unconsciously, showed the difference betwixt laboured efforts and a stately transit, unaccompanied by dips, and picks up, which are not particularly reassuring for a vastly more extended trip. True it is that the balloons used were small, while Green's was large, still by General Brine's own showing, Channel ballooning is not such easy or safe work, but there is a way, I feel certain, in which the difficulties of this kind of ballooning may be very considerably reduced, but it is for every one who desires to increase his professional knowledge in this line to follow and stand fast by his own plans, and not to imitate those of other people.

THE BALLOON ASCENTS OF 1888.

IN taking leave of the admirers and promoters of an art, which I have endeavoured to portray in its true colours, I shall be expected to say a few words by way of conclusion.

Frequently throughout these pages references have been made to the delights of air travelling, as well as to the dangers inseparable from this mode of conveyance.

I have represented both the bright and the sombre side just according to my own experiences, and without, it is hoped, laying extravagant stress on the roseate part of the subject, or of describing too minutely the risks encountered during rough weather, and these results certainly ought not to be omitted in a volume which is designed to prove truthful as well as instructive.

It is devoutly to be hoped that ardent young aspirants will not forget, before they embark in a pursuit of this kind, to take note of the teachings of my book, and not to be impressed with the idea that ballooning can be followed for any length of time without meeting with accidents while journeying through our atmosphere, the capricious character of which I have faithfully depicted.

During the past summer numerous ascents have been made in weather, which, aëronautically speaking, has been of a mild, although abnormal character, strong winds having been the exception and not the rule.

Fatalities, however, have occurred, and we cannot fail to notice the almost total absence of military and meteorological experiments as a set off, to some extent, to mere sensational exhibitions.

The public taste appears to have been invited to—and to have rejoiced in—exploits which have not contributed very much to the dignity, advancement, or useful application of aërostation.

There have been no lack of daring and defiant performances. Professor Baldwin's parachute descents have taken place, with one or two exceptions, under remarkably favourable auspices. In his last trip from the Alexandra Palace, when royalty witnessed the concluding descent, the balloon appeared to hesitate, half way up, as to her course, and actually stood still between the Prince and the Palace as if a near and majestic drop were the right sort of thing for this special occasion.

It was the most pleasing illustration of the so-called jump, but, of course, the tranquil air, and not any guiding power, caused the lucky parachutist to alight almost at the feet of the Prince and Princess of Wales, whose congratulations were warmly bestowed.

Well might such patronage stimulate Mr. George Higgins, a British rival, who had just made a first successful essay, to tread closely upon the heels of the clever American. Mr. Higgins has shown at Coventry and

elsewhere, that one Briton, at any rate, can emulate the series of parachute drops which have proved so attractive; he must be content to further win his spurs before he wears them, and must not forget that he and others will have a great deal of up and down work to surpass Baldwin's achievements; but it is only fair to the Englishman to say that his lead off from the Greyhound Gardens, Lea Bridge, and from Leicester, were most plucky, as strong winds prevailed at the time.

Mr. Higgins has had the advantage of a good trainer in the person of Mr. Arthur Orton, whose balloon "The Eagle," bore a suitable name for an international parachute contest.

It is said that other experimentalists will appear next year to try their hand even if they do not display aptitude in this branch of ballooning.

When, however, we think of Miss Dare's performances, as well as those to which allusion has been made, we ought not to shut our eyes to the ghastly episode in Ottawa, and in Essex. It is to be hoped that a fresh outburst of the parachute fever will not become general.

There were one or two new departures this year to which reference should be made; the first consisted of the ascent of a bottle-shaped balloon, which was constructed by the manufacturer, Charles Green Spencer, whose father's name is so well known in connection with the veteran Green. Messrs. Spencer & Son, of Holloway, made this novel shaped balloon with a view of calling *public* attention to Mr. John Gosnell's Cherry Blossom *perfume*, but as the gaseous contents of the aërial bottle

cannot be particularly sweet, it strikes me that a case of Cherry Blossom in glass bottles, would prove serviceable for a blending process, especially when expansion takes place, and after the descent when the gas is being let off. In that situation, gentlemen, and especially ladies, would gladly make a purchase to remove the atmospheric contamination.

I may also mention a feature connected with Montgolfier balloons, which purports to be an improvement in the method of heating the air. This is effected by Mr. J. J. Norman's petroleum burner, which has been seen by Major Templer, and is spoken favourably of by Mr. Brearey, Honorary Secretary of the Aëronautical Society of Great Britain. I hope to see this plan, and to form my own opinion of its merits.

Lastly, it has been announced that Mr. John Sangster will place at the disposal of Mr. Le Fevre and the Council of the Balloon Society £1,000 towards a fund to reward the first aërial navigator who solves the problem of conducting, scientifically, a machine through the air, as ships are navigated through the water.

While I write I receive an account of a parachute disaster which I subjoin.

"B. F. Vandegrift, the American aëronaut, met with a fearful death at Columbus, Ohio, on Thursday week. He had ascended in his balloon from Exhibition Park, with a view of descending by means of a parachute. When the balloon had reached an altitude of about half-a-mile it suddenly collapsed and began to descend. The spectators were terror-stricken, as they expected to see Vandegrift

dashed to pieces on reaching the ground. With great presence of mind, however, the aëronaut cut the cord attaching the parachute to the balloon, and tried to leap clear of the latter. After descending rapidly for some distance, the parachute expanded and sailed away on the wind. The balloon, however, bore rapidly down upon the aëronaut, and threatened to become entangled with the parachute. By dexterous management, Vandegrift was able to keep clear of it. But now a new danger presented itself. It was seen that the course the parachute was taking would inevitably lead to its descent into the turbulent waters of the Chatahoochee River, and a great cry went up from the crowd. As the parachute approached the water Vandegrift was heard to cry wildly, 'Save me! save me!' These words of entreaty were addressed to two fishermen who were paddling up stream in a small boat. The men heard the cry and rowed towards the descending parachute as swiftly as possible, reaching the scene a few minutes after it had settled in the water. The balloonist caught hold of the side of the bateau, and in trying to draw himself up partially overturned the frail craft which began to fill rapidly. The men in the boat became alarmed, and rushing to the opposite end, by some means Vandegrift lost hold and sank. He never rose again, and search for his body was still in progress when this report left."

Taken as a whole, the aëronautic doings of this year form a singular combination of novelties, though it must be confessed that the era of 1888 has not proved that the solution of a long looked for problem is very close at *hand*. But there are no reasons for despair. We have

had an opportunity of frequently observing the wonderful sustaining powers of air, when a sufficient surface has grappled with the lighter fluid above. What we now require is motive *force* instead of a mere compressing contrivance like a parachute. It is not reasonably to be expected, that in little more than a century, a modern art, which has to do battle with so attenuated a substance, as indeed the ocean overhead has been found, will yield to man's ingenuity so quickly as desired.

Ballooning is still an infant, but it will lead to aërial navigation and will grow if duly nurtured and indefatigably pursued by the right sort of cultivation.

It is this which is so much needed, and it may be that a high order of association will, one day, be formed, composed of leaders and members, whose motives, abilities, and means, will enable them to reward those who can really lead us forward to emulate the feathered tribe, and to accomplish propulsion through the air as we now travel over the water.

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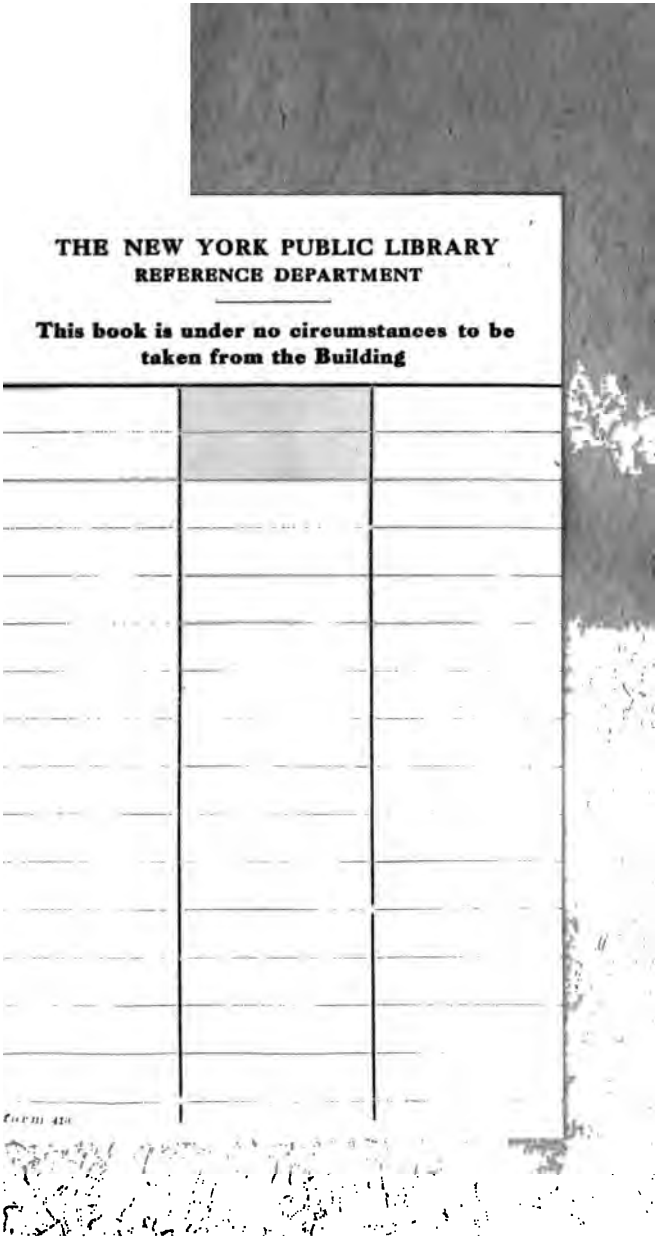

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